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SCIENCE BULLETIN

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November 25, 1948
Lawrence, Kansas

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ANNOUNCEMENT

The *University of Kansas Science Bulletin* (continuation of the *Kansas University Quarterly*) is issued in parts at irregular intervals. Each volume contains from 300 to 600 pages of reading matter, with necessary illustrations. Exchanges with other institutions and learned societies everywhere are solicited. All *exchanges* should be addressed to the Library of the University of Kansas.

The University of Kansas Science Bulletin,
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The actual date of publication (*i. e.,* mailing date) of many of the volumes of the University of Kansas Science Bulletin differs so markedly from the dates bourne on the covers of the publication or on the covers of the separata that it seems wise to offer a corrected list showing the mailing date. The editor has been unable to verify mailing dates earlier than 1932. Separata were issued at the same time as the whole volume.

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PLATE I

(Reprinted from Science Bulletin XI)

FIG. 1. Filaments of Spirogyra before being fed upon by a corixid

FIG. 2 The same after being fed upon by a corixid. Note the empty filaments.

FIG. 3. *Sigara* (*Vermicorixa*) *alternata* (Say) our most widespread and common North American corixid.

FIG. 4. A highly magnified portion of the Spirogyra shown in figure 2 Note the punctured and empty cells

FIG. 5. The stomach contents of a small corixid nymph after thirty minutes of feeding on Spirogyra.

The above illustrations form conclusive proof of the herbiverous tastes of a water boatman. For further evidence on the feeding habits of Corixidae see Hungerford, H. B., in Science Bulletin Vol XI, pp 239-249 (1920). Further studies are in progress, indicating that certain species feed also upon mosquito larvae. Dr. R. I. Sailer reports a *Callicorixa* species in Alaska that is useful in the control of a pest mosquito there

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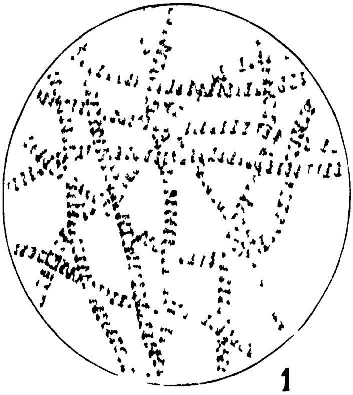
The color drawings on this plate were made by Miss Ellen Edmonson

COLOR PLATE 1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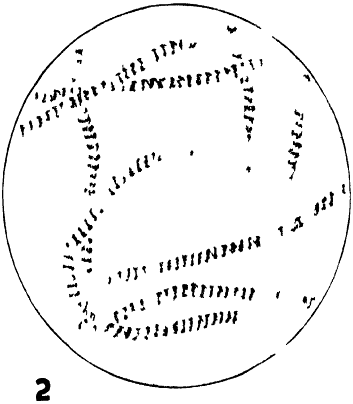
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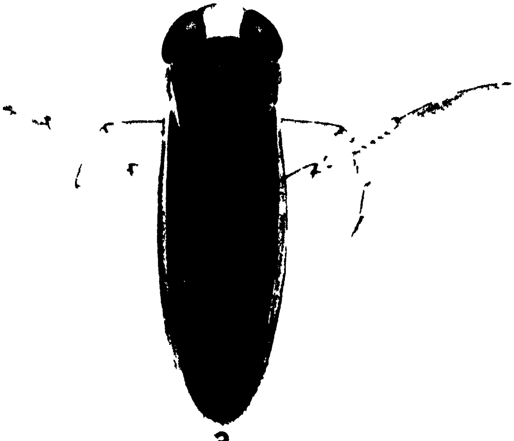
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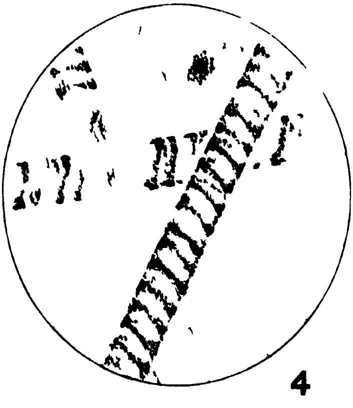
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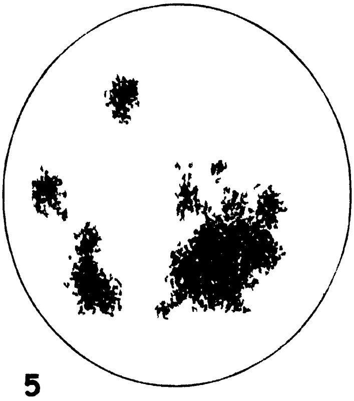
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THE UNIVERSITY OF KANSAS
SCIENCE BULLETIN

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ABSTRACT

This paper constitutes a monographic revision of the family Corixidae of the Western Hemisphere, including a monograph on the genus *Trichocorixa* Kirk., by Doctor Reece I. Sailer Although primarily taxonomic, material is included on the biology and morphology of the family.

Prior to this work some 165 species and 6 subspecies were known from the Western Hemisphere. Forty-four new species, including seven by Sailer*, and six new subspecies, including three by Sailer, are presented in this paper.

Three new subfamilies are established, the Cymatiinae, the Heterocorixinae, and the Stenocorixinae. New tribes set up are the Agraptocorixini, the Glaenocorisini (for *Glaenocorisa* Thoms., and *Dasycorixa* n gen.), and the Graptocorixini (for *Graptocorixa* Hungfd., *Neocorixa* Hungfd and *Pseudoglaenocorisa* Jacz.). Two new genera, *Cenocorixa* and *Dasycorixa,* are described for, respectively, *Arctocorixa wileyæ* Hungfd. and *Glaenocorisa hybrida* Hungfd. The following subgenera are described in *Sigara*. *Allosigara* for *Arctocorisa decorata* Abbott; *Aphelosigara* for *Sigara jarmanae* Hungerford; *Arctosigara* for *Arctocorixa conocephala* Hungerford; *Lasiosigara* for *Notonecta lineata* Forster; *Pediosigara* for *Arctocorisa hydatotrephes* Kirkaldy; *Phaeosigara* for *Corisa signata* Fieber; *Pileosigara* for *Arctocorixa douglasensis* Hungerford; and *Xenosigara* for *Arctocorisa ornata* Abbott.

The following new species are described: *Arctocorisa lawsoni* (Colorado); *Callicorixa tetoni* (Wyoming); *Cenocorixa andersoni* (Washington, etc.); *C. kuiterti* (California, etc.), and *C. sorensoni* (Utah); *Dasycorixa rawsoni* (Saskatchewan); *Ectemnostega darwini* (Argentina); *Ectemnostegella jamesi* (Bolivia), *E. lundbladi* (Perú), *E. pilosafrons* (Perú), *E. stridulata* (Perú), *E tumidacephala* (Perú), *E. venturii* (Argentina), and *E woytkowskii* (Perú); *Heterocorixa anduzei* (Venezuela), *H. hintoni* (Bolivia), *H. jaczewskii* (Brazil), *H. lundbladi* (Brazil), *H. woytkowskii* (Perú), and *H. wrighti* (Brazil); *Neosigara murilloi* (Colombia); *Sigara (Tropocorixa) argentiniensis* (Argentina), *S. (T.) braziliensis* (Brazil), *S. (T.) egbertæ* (Argentina), and *S. (T.) roberti* (Brazil); and *Sigara (Vermicorixa) cubiensis* (Cuba and Porto Rico), *S. (V.) defecta* (Minnesota, etc.), *S. (V.) grossolineata* (Michigan, etc.), *S. (V.) johnstoni* (Minnesota), *S. (V.) knighti* (Michigan), *S. (V.) mathesoni* (Nova Scotia, etc.), *S. (V.) mckinstryi* (California), *S. (V.) vandykei* (California, etc.), *S. (V.) virginiensis* (Virginia, etc), *S. (V.) washingtonensis* (Washington, etc.), and *Sigara (Pediosigara) depressa*. The new subspecies named are *Heterocorixa hesperia venezuelana* (Venezuela), *Heterocorixa wrighti ollalai* (Brazil), and *Palmacorixa nana walleyi* (Kansas, etc.). In addition, *Callicorixa noorvikensis* Hungerford is reduced to a subspecies of *Callicorixa producta* (Reuter).

Up to and including this paper (exclusive of synonyms) there have been described from the Western Hemisphere 209 species and 12 subspecies. These are distributed as follows: in North America, including Mexico, 137 species and 9 subspecies; in Central America and Insular America, 17 species; and in South America and the Galapogos Islands, 58 species and 3 subspecies.

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* See Sailer's paper on page 289 for a list of the new species, subspecies, and varieties described by him in *Trichocorixa*.

THE UNIVERSITY OF KANSAS
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VOL. XXXII | NOVEMBER 25, 1948

The Corixidae of the Western Hemisphere

(Hemiptera)

H. B HUNGERFORD, University of Kansas*

(Including a monograph on the *Trichocorixa* by R. I Sailer)

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* Contribution from the Department of Entomology, University of Kansas, with acknowledgments to the University of Michigan Biological Station for opportunity to pursue this study during many summers there.

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INTRODUCTION

The identification of American Corixidae has been a difficult and discouraging task for many years. The uniformity of shape, similarity of color patterns, the lack of obvious structural characters have always made this family a perplexing one. The early descriptions of American corixids dealt largely with color patterns, which are both variable and almost indescribable, and were made by European workers whose types were in European museums or by American workers whose types were not designated. When Doctor Abbott undertook his studies (about 1910) the Uhler material was available in this country but the Fieber species were in European museums and were inadequately known. Abbott's own descriptions were based upon such characters as were already in use. At the close of his studies (about 1918) he left two new genera and 17 new species names with their types, some of which were not labeled, and two keys, one to the Corixidae of Georgia, 1913 (Bull. Brooklyn Ent. Soc. VIII, pp. 87-91) including 17 species, and one to the Corixidae in "The Hemiptera of Connecticut," 1923, in which he keyed out four genera and in the genus *Arctocorisa* placed 11 species, 6 of which were his own. It has since been found that he determined correctly but one of Fieber's species. Doctor Abbott's withdrawal from academic work and the taxonomic study of Corixidae left no one in America willing to identify specimens in this family. Since I was engaged in a study of the biology and ecology of Aquatic Hemiptera, this was a serious matter and I was forced to make my own determinations. Therefore, I undertook to find more precise characters to supplement those in use and then to place the species described by Fieber and others. The latter task made necessary a trip to European museums to examine types. During the years since Abbott's time there have appeared two papers on North American Corixidae containing keys, one of them in Blatchley's *Heteroptera of Eastern North America*, 1926, which keys out seven genera and brings together the descriptions of some fifty-one species, and the use of which would lead to many misdeterminations. The other by Walley, 1930, keys out twenty species recorded from Ontario and Quebec (Can. Ent. LXII, pp. 285-286). Thus with no comprehensive key available and new species appearing from time to time, some review of the American Corixidae has long been desirable. It is my hope that this paper may prove useful to those who are interested in the Corixidae of the Americas and make possible the study of the biology and ecology of this interesting and unique family of water bugs.

BIOLOGY OF CORIXIDAE

For those who find pleasure in collecting aquatic insects the following brief notes on the biology of Corixidae may be interesting.

HABITATS

The Corixidae are found for the most parts in pools, ponds and lake lagoons where they spend most of their time on the bottom. Some species are found in slowly flowing streams, a few in fast water, and one American species has been taken repeatedly on the bottom of Lake Erie at depths of from fourteen to thirty-five feet! While the majority live in fresh water, some will inhabit saline or brackish waters. Some species prefer waters with aquatic vegetation, others more open areas. Some breed only in permanent waters, while others invade the temporary pools and ponds, raise their young and retreat to more stable conditions for the winter.

FLIGHTS

Corixidae normally possess well-developed flight wings and have been taken at trap lights at night and occasionally recorded in large flights. In flight the hemelytra and metathoracic wings are united by a characteristically Heteropterous device. It is situated at the apex of the under surface of the clavus of the hemelytron and consists usually of two parallel, short longitudinal ridges between which enters the turned-up portion of the costal margin of the hind wing. In the water, of course, the fragile and membranous flight wings are folded beneath the hemelytra which are buttoned down both along the inner vannal margin and the basal costal margin. In certain genera the flight wings are often reduced and nonfunctional as in *Palmacorixa, Krizousacorixa* and *Cymatia* for example.

FOOD

Corixidae are largely herbivorous. They may forage on the bottom, sweeping into the stomach quantities of the organic ooze with its attendant populations, both plant and animal, the bulk of the material being of plant origin. In the feeding process they may ingest, besides the desmids, Euglena and other unicellular algae, filaments of Oscillatoria, Zygnema, Mougeotia and Spirogyra. They have been observed to puncture the cells of the larger filaments of Spirogyra and suck out the chlorophyll as shown in the colored plate.[1] The ingestion of multicellular organisms and the packing of the stomach with skeins of filamentous algae is indeed unique amongst the sucking insects of the order Hemiptera. The nature and abundance of the food supply of corixids is one explanation of their dominance and gives them an advantage over all other families of aquatic Hemiptera which are uniformly predaceous in their feeding habits. There are indeed some species of Corixidae the palae of which are not flattened and spoon-shaped, and which may still be predaceous. *Cymatia americana* Hussey, for example, has been reported by Hungerford[2] to show cannibalistic behavior in its first instar. Hale, in his studies on Australian Corixidae,[3] says, "For months I kept in aquaria several species of Corixidae as well as members of Notonectidae and Naucoridae and during that time they were fed only upon larvae of *Culex fatigans* and *Scutomyia notoscripta.* Even newly hatched Corixidae were observed to capture tiny mosquito larvae, increasingly large examples being taken during the successive stages of the metamorphosis." Poisson, 1935,[4] also reported that the large species of *Corixa* readily captured larvae of Culicidae and Chironomidae and believed that the animal food is even necessary to the females at the time of egg laying. This appears to be the conclusion of Haken Lindberg[5] also for *Callicorixa producta* and *Arctocorisa carinata.* We believe, however, that Griffith,[6] 1945, has given a fair analysis of the food gathering behavior and food sources of the average corixid. Since most corixids we have observed foraging upon the flocculent ooze in the bottom of the pool now and then swallow Arcella and other small animals, it is not surprising to see their occasional capture of some small insect. Doctor Sailer observed a species of *Trichocorixa* feeding upon its own eggs. Nevertheless, Corixidae as a group may be looked upon as members of the producing class in the waters where they are found and form a link in the food chain between the "nutritious salad" or organisms in the bottom ooze, and typically predaceous forms. Gathering their food from the organic ooze at the bottom of the pool or feeding upon filamentous algae, they in turn make forage for the many predatory animals that lurk in the shadowy places or dart in pursuit of their prey.

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[1] Hungerford, H. B., 1917, Science N S. XLV, pp. 336-337; Jl. N. Y. Ent. Soc. XXV, pp. 1-5; 1920 Kansas Univ Sci. Bull. XI, pp. 284-249. See, also, Sutton, Muriel, 1947 Nature Vol. 160, p. 122.

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[2] Hungerford, H. B., 1923, Notes on the eggs of Corixidae. Bull Brooklyn Ento Soc., XVIII, No. 1, p. 14.

[3] Hale, Herbert M., 1922, Studies in Australian Aquatic Hemiptera, No. 1, Corixidae, Records of the South Australian Museum, Vol. II, No. 2, p. 310.

[4] Poisson, R., 1935, Les Hémiptères aquatiques (Sandaliorrhyncha) de la Faune française. Arch. de Zool. Exp. et Gen., LXXVII, Fasc. 2, p. 480.

[5] Lindberg, Haken, 1944.

[6] Griffith, Melvin, 1945, Univ. of Kansas Sci Bull., XXX, Pt II, No. 14

STRIDULATION

Although stridulation has been known among Corixidae since 1845 when Mrs. R. Ball and Miss M. Ball[7] recorded that *Corixa striata* Curt. was capable of producing two quite different sounds, it was not until 1935 that the way in which the sound is produced was explained by Heinz von Mitis.[8] He also was working with European species of Corixidae. According to his observations, in the Corixinae neither the strigil nor the palar pegs of the male have anything to do with the sound production. Only those species in which the males are equipped with a field of pegs on the base of the front femur are capable of producing sound, and the sound is produced by rubbing this peg field over the sharp lateral cephalic margin of the head. The tone thereby formed is given resonance by the air chambers in head and prothorax. In the Micronectinae von Mitis observed *Micronecta meridionalis* Costa and concluded that the strigil is an essential part of the strong tonal device of these insects.

In our American Corixidae the only published record of sound production is by Hungerford[9] who heard *Palmacorixa buenoi* Abbott chirp in an aquarium one cloudy afternoon. From the structural evidence, the *Krizousacorixa* should be the loudest sound producers among our American water boatmen. The males have remarkably developed peg fields on enlarged anterior femora and a thickened margin on the head which, with the prothorax, is inflated. American Corixidae which should be capable of sound production are the males of the following:

Krizousacorixa femorata (Guèrin)
Krizousacorixa azteca Jaczewski
Trichocorixella mexicana (Hungerford)
Palmacorixa gillettei Abbott
Palmacorixa nana Walley
Palmacorixa nana walleyi Hungerford
Palmacorixa buenoi Abbott
Corisella decolor (Uhler)
Corisella tarsalis (Fieber).
Corisella tarsascana Jaczewski
Corisella hidalgoensis Hungerford*
Ectemnostegella montana Lundblad
Ectemnostegella stridulata Hungerford*
Pseudocorixa conata (Hungerford)
Pseudocorixa beameroidea (Hungerford)

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[7] Ball, Mrs. R., and Miss M. Ball, 1845. Rep. British Assoc. XV, pp. 64-65; 1846. Ann. Mag. Nat. Hist. XVII, pp. 135-136.

[8] Von Mitis, Heinz, 1935, Zur Biologie der Corixiden Stridulation. Zeitschrift für Morphologie und Okologie der Tiere XXX, pp. 479-495.

[9] Hungerford, H. B., 1920, The Biology and Ecology of Aquatic and Semiaquatic Hemiptera. Univ. of Kansas Science Bulletin XI, p. 228.

* New species in this paper.

Arctocorisa planifrons (Kirby)
Arctocorisa sutilis (Uhler)
Arctocorisa carinata (Sahlberg)
Arctocorisa chanceæ Hungerford
Arctocorisa convexa (Fieber)
Arctocorisa lawsoni Hungerford*

Callicorixa vulnerata (Uhler) and possibly others, for *C. praeusta* (Fieber) has been heard to stridulate and its stridular area is not conspicuous.

Hesperocorixa escheri (Heer)
Hesperocorixa georgiensis (Egbert)
Hesperocorixa harrisii (Uhler)
Hesperocorixa interrupta (Say)
Hesperocorixa lobata (Hungerford)
Hesperocorixa lucida (Abbott)
Hesperocorixa martini (Hungerford)
Hesperocorixa vulgaris (Hungerford)
Sigara (*Tropocorixa*) *chrostowkii* Jaczewski
Sigara (*Tropocorixa*) *brachypala* (Hungerford)
Sigara (*Tropocorixa*) *townsendi* (Hungerford)
Sigara (*Tropocorixa*) *czakii* Jaczewski
Sigara (*Tropocorixa*) *denseconscripta* (Breddin)
Sigara (*Tropocorixa*) *denseconscriptoidea* (Hungerford)
Sigara (*Tropocorixa*) *dita* Jaczewski
Sigara (*Tropocorixa*) *forciceps* (Spinola)
Sigara (*Tropocorixa*) *hosfordæ* (Hungerford)
Sigara (*Tropocorixa*) *rubyæ* (Hungerford)
Sigara (*Tropocorixa*) *schadei* (Hungerford)
Sigara (*Tropocorixa*) *santiagiensis* (Hungerford)
Sigara (*Tropocorixa*) *argentiniensis* Hungerford*
Sigara (*Tropocorixa*) *boliviensis* Hungerford
Sigara (*Tropocorixa*) *femoridens* Hungerford
Sigara (*Tropocorixa*) *termasensis* (Hungerford)
Sigara (*Tropocorixa*) *trimaculata* (LeGuillou) (=*fazi* (Hungerford)
Sigara (*Subsigara*) *fallenoidea* (Hungerford)
Sigara (*Pileosigara*) *douglasensis* (Hungerford)
Sigara (*Phaeosigara*) *macropala* (Hungerford)
Sigara (*Phaeosigara*) *compressoidea* (Hungerford)
Sigara (*Phaeosigara*) *mackinacensis* Hungerford
Sigara (*Phaeosigara*) *zimmermanni* (Fieber) (=*compressa* (Abbott)
Sigara (*Phaeosigara*) *signata* (Fieber)
Sigara (*Phaeosigara*) *quebecensis* (Walley)
Sigara (*Phaeosigara*) *mississippiensis* Hungerford
Sigara (*Phaeosigara*) *bradleyi* (Abbott)
Sigara (*Phaeosigara*) *sigmoidea* (Abbott)
Sigara (*Phaeosigara*) *paludata* Hungerford
Sigara (*Phaeosigara*) *macrocepsoidea* Hungerford
Sigara (*Phaeosigara*) *dolabra* Hungerford & Sailer
Sigara (*Vermicorixa*) *scabra* (Abbott)
Sigara (*Vermicorixa*) *defecta* Hungerford*
Sigara (*Vermicorixa*) *gordita* (Abbott)
Dasycorixa hybrida (Hungerford)
Dasycorixa johanseni (Walley)
Dasycorixa rawsoni Hungerford*
Cenocorixa wileyæ (Hungerford)
Cenocorixa andersoni Hungerford*
Cenocorixa expleta (Uhler)
Cenocorixa blaisdelli (Hungerford)

Cenocorixa utahensis (Hungerford)
Cenocorixa dakotensis (Hungerford)
Cenocorixa bifida (Hungerford)
Cenocorixa kuiterti Hungerford*

MATING

Mating takes place in the water, the male mounting the female and embracing her with his front legs, his usually flattened face closely appressed against her dorsum and his abdomen, if dextral, curved around the left side of the female, if sinistral, around the right side. In cases of reversed asymmetry Doctor Poisson[10] has found in *Corixa affinis* and *Sigara sahlbergi* that these abnormal males have no trouble mating with their females but do so by directing the abdomen to the opposite side from that which is normal. It seems probable that both the palar pegs and the strigil assist the male in a firm clasp of the female during copulation. That these are not essential in all species is indicated by the *Callicorixa* and some others that lack the strigil, and by *Cymatia* which lacks both palar pegs and strigil.

OVIPOSITION

We know nothing of the egg laying habits of the subfamilies Diaprepocorinae, Stenocorixinae and Heterocorixinae. Of the Micronectinae the eggs of *Micronecta meridionalis* and *Micronecta poweri* were figured by Poisson, 1938. The eggs of both species are attached horizontally to their support; that of the former is covered with projections, that of *M. poweri* is not. Neither the shape of the egg nor its method of attachment is like that of the Corixinae. It would be interesting to determine the egg laying habits of the genus *Tenagobia* which, in the Western Hemisphere, is the counterpart of *Micronecta.* The eggs of the *Cymatiinae* and *Corixinae* are better known. The eggs of these Corixidae are more or less top-shaped and attached to their support by a buttonlike disk.[11] Between the disk and the egg there is a very short stem in most species but in some genera, *Cymatia, Agraptocorixa* and *Krizousacorixa* for example, the egg is supported on a stalk of considerable length. The eggs are attached to any available support the water affords and it is not uncommon to find the underside of lily pads and submerged brush solidly covered with them. Their astonishing numbers in the water is more nearly appreciated when we recall that they have been gathered by the Mexicans from reeds submerged for the purpose and utilized by them as food. The American genus *Ramphocorixa,* which inhabits muddy pasture ponds, has the curious habit of placing its eggs on the carapace of the crayfish.

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[10] Poisson, R., 1935, Arch. Zool. Exp. et Gen. LXXVII, p. 475.

[11] For structure of corixid eggs see Poisson, 1935, Arch. Zool. Exp et Gén. 77, Fasc. 2.

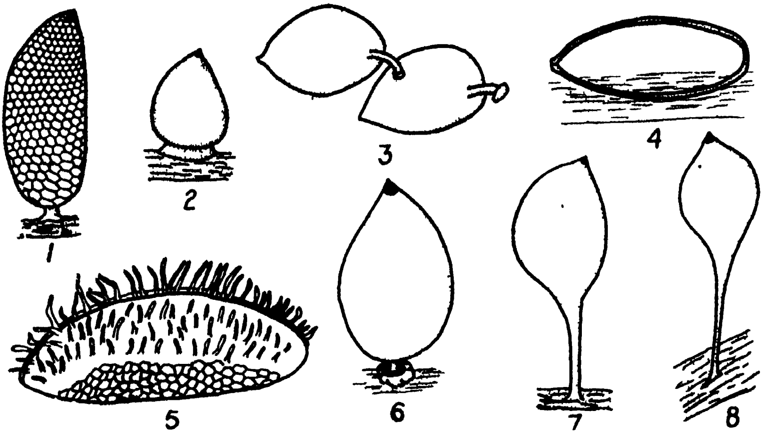


FIG. 1 The Eggs of Corixidae (1) *Ramphocorixa acuminata* (Uhl.), after H. B. Hungerford, 1923, Bull. Brookl. Ent Soc, XVIII, Pl I, fig. 4; (2) *Sigara* (*Vermicorixa*) *alternata* (Say), after H. B. Hungerford, 1917; Jl. N. Y Ent. Soc, XXV, Pl 9, fig. 1; (3) *Krizousacorixa femorata* (G.-M.), after Guérin-Méneville; (4) *Micronecta poweri* (D. & S), after R Poisson, 1938, Ann Soc Ent. Fr, CVII, text fig. 42; (5) *Micronecta meridionalis* (Costa). after R. Poisson, 1938, Ann. Soc. Ent. Fr., CVII, text fig. 14; (6) *Sigara* (*Sigara*) *striata* (L.), after R. Poisson, 1935, Ann. Ent. Soc. Fr., CVII, text fig. XVII A; (7) *Agraptocorixa eurynome* (Kirk), after H H. Hale, 1922, Records of the South Australia Museum, II, No. 2, p. 311, fig. 339 B; (8) *Cymatia americana* Hussey, after H. B. Hungerford, 1923, Bull. Brookl. Ent. Soc. XVIII, Pl. 1, fig. 4.

NYMPHAL LIFE

Corixidae undergo five nymphal instars as do the majority of aquatic Hemiptera. The wing pads show plainly, beginning with the third instar at which time the spiracles become functional. Scent glands open by paired pores on the caudal margin of the third, fourth and fifth dorsal abdominal segments. In the adult these glands are replaced by a metathoracic gland opening into scent gland orifices laterad of the middle coxae (see plate III). The nymphs have two segmented antennae, one segmented hind tarsi, and the pala and tibia of the front leg is a single segment. There may be one or two generations a year depending upon the species or the climate.

PLATE II

LIFE HISTORY OF A BOATMAN

(Reprinted from "Life History of a Boatman," by H. B. Hungerford, Jl. N. Y. Ent. Soc. XXV, No. 2).

FIG. 1. Egg of *Sigara* (*Vermicorixa*) *alternata* (Say).

FIG. 2. Adult of *Sigara* (*V.*) *alternata* (Say).

FIG. 3. Egg of an unknown small corixid.

FIG. 4. First instar nymph of *Sigara* (*V.*) *alternata* (Say).

FIG. 5. Second instar nymph of *S.* (*V.*) *alternata* (Say).

FIG. 6. Tarsus and claws of hind leg of first instar nymph.

FIG. 7. Third instar nymph of *S.* (*V.*) *alternata* (Say).

FIG. 8. Egg shell after nymph has left it.

FIG. 9. Fourth instar nymph of *S.* (*V.*) *alternata* (Say).

FIG. 10. Front leg of late fifth instar nymph, showing tibia and tarsus of adult within the terminal nymphal segment.

FIG. 11. Fifth instar nymph of *S.* (*V.*) *alternata* (Say).

FIG. 12. The front leg of the male.

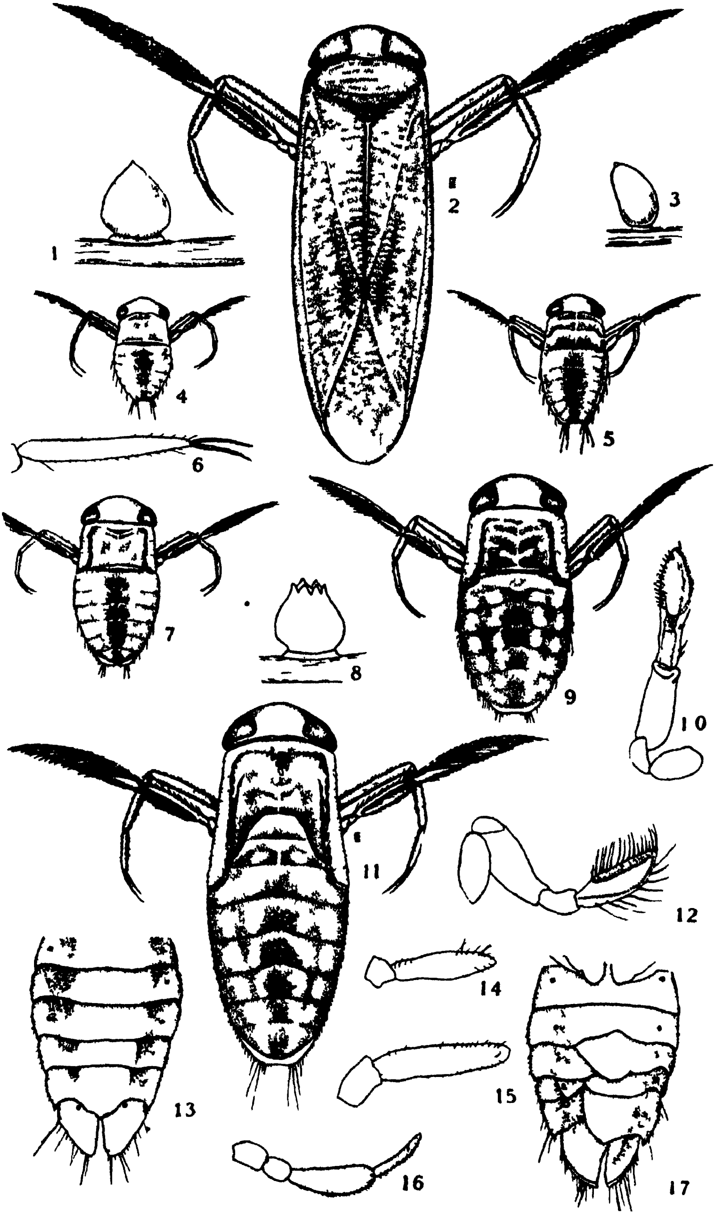
FIG. 13. Ventral view of the abdomen of the female.

FIG. 14. Antenna of third instar nymph.

FIG. 15. Antenna of late fifth instar nymph, showing the three distal segments of the adult in the terminal nymphal segment.

FIG. 16. Antenna of the adult.

FIG. 17. Ventral view of the abdomen of a male, showing characteristic male asymmetry.



HIBERNATION

Poisson, 1935, says that *Micronecta* winters in the larval stage, chiefly in the second instar. The majority of the Corixinae winter as adults, although Poisson, 1935. found that *Corixa affinis* may winter also in the egg stage and Griffith, 1945,[12] reports some eggs of *Ramphocorixa acuminata* (Uhler) as passing the winter successfully. The species also winter as adults. Hungerford, 1920, found that *Palmacorixa buenoi* Abbott wintered at Ithaca, N. Y , as fourth instar nymphs. Farther south adults of this species have been taken in the winter time. Hussey, 1921.[13] found *Cymatia americana* Hussey in Minnesota on January 15 under two feet of ice in air bubbles in the ice. Corixids of various species may be taken in midwinter swimming beneath the ice.

TAXONOMY OF CORIXIDAE

THE SYSTEMATIC POSITION OF THE CORIXIDAE

The first corixids described were placed under *Notonecta* in the Hemiptera. Leach, 1817,[1] placed them in his tribe Notonectides and considered the genera *Corixa* Geoffroy and *Sigara* Fabricius as comprising a family separate from *Notonecta* Linn. and *Plea* Leach. Then Börner, 1904,[2] proposed to place the Corixidae in a new suborder, Sandaliorrhyncha, because they are structurally so different from other Hemipterous insects. Reuter, 1912,[3] reduced Sandaliorrhyncha to series rank and proposed Corixoideae as a superfamily with the single family Corixidae in it. Oshanin, 1912[4] and Van Duzee, 1917,[5] accepted Reuter's proposal but Torre-Bueno, 1917,[6] thought that Sandaliorrhyncha should have ordinal rank. Börner, 1935,[7] made the following proposal: "Subordo: Heteroptera. Überfamilie: Hydrocorisae (Cryptocerata). Familienreihe: Corixoidea (Sandaliorrhyncha). Familien: Sigaridae, Corixidae." In another paper appearing the same year[8] and apparently written earlier Börner used the same major divisions but in the one family, Corixidae, placed the "Unterfam. Corixinae" with the genera *Cymatia* Flor,

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[12] Griffith, M. E., 1945, Univ of Kansas Sci. Bull. XXX, Pt. II, No. 4, p. 279.

[13] Hussey, Roland, 1921, Psyche, XXVIII, p 93.

[1] Leach, William Elford. Brewster's Edinbg. Encyc. IX, p. 124, 1815; Am. edn. VIII, p. 713, 1832.

[2] Börner, Carl. Zool. Anzieg. XVII, p. 522.

[3] Reuter, O. M. Of. Finska Vet. Soc. Forh. LIV, Afd. A. No. 6, pp. 13, 48.

[4] Oshanin, B. F. Kat. Palae. Hemip., p. 91.

[5] Van Duzee, E. P. Cat. of Hemiptera of America . . . , p. 476.

[6] Torre-Bueno, J. R. de la. Ann. Ent. Soc. Am. IX, p. 358.

[7] Börner, Carl. Ent. Beihefte aus Berlin-Dahlem 1, pp. 138-144.

[8] Börner, Carl. *In* Tierwelt Mitteleur, Leipzig 4 1 Tiel, 3 Lief. X, pp. 10-11.

Corixa Geoffr., *Callicorixa* B. White, and *Sigara* Fabr. and the "Unterfam. Micronectinae." It is not clear to me why Doctor Börner used Sigaridae instead of Micronectidae. The proposal of Douglas and Scott, 1865, to make separate families of Corixidae and Sigaridae was not accepted and Börner's suggestion is not followed by Stichel, 1935, and several other workers since that time. In 1930 Mr. H. P. Jones established the family Micronectidae, and Kiritshenko, since 1938, has used the families Micronectidae and Corixidae. Before I agree with Mr. Jones and Doctor Kiritshenko I wish to see the eggs of *Tenagobia* and *Diaprepocoris*. The shape of the *Micronecta* egg is very different from that of the other corixid forms that are known.

The consensus of opinion, however, appears to be that there is only one family, and that this family is sufficiently different from other Hemiptera to be set apart by some higher category. According to Mr. China's [9] Heteropterous family tree, the branch bearing the Corixidae and Notonectidae split off from the Heteropterous trunk very early and was itself separated into the notonectid and corixid branches at an ancient date. It seems to me, however, that the branch that gave rise to the Helotrephidae, Pleidae and Notonectidae should be closer to the Naucoridae than to the Corixidae, and with this idea Mr. China now concurs.

The Corixidae have unique mouthparts and front legs which, with the possession of scent glands on the abdominal dorsum of the nymphs, set them quite apart from other aquatic Hemiptera.

From a study of the genera of Corixidae living today we believe that the ancestral Corixidae had ocelli and a well developed scutellum as the Diaprepocorinae still do. In the primitive males probably there was little, if any, abdominal asymmetry and no strigil. The loss of a strigil in *Callicorixa*, in some *Tropocorixa* and a few others appears to be secondary.

Since the corixid mouthparts and the modifications of the front legs are intimately related to the feeding habits, it is desirable to decide whether the ancestral form was herbivorous, sucking the chlorophyll from plants, or predaceous upon other animal forms. Tillyard,[10] judging from wing remains, traces the Homoptera to the Lower Permian and recognizes no Heteroptera until the Triassic. He says that "comparative morphology indicates that neither of the existing suborders is derived from the other but both from a lost common ancestor." Since the Homoptera are herbivorous, it seems logical that the primitive Heteroptera were also herbivorous. However, it does not necessarily follow that the first corixids were herbiverous. The wide spread habit of the Corixidae of gathering their food from the flocculant bottom ooze of their aquatic habitat, with its attendant population of algae and other organisms, may have been a modification from the habit of extracting the chlorophyll from large filamentous algae, to ingesting whole filaments of the finer algae and then to sweeping in the desmids and other organisms in the ooze. On the other hand, predaceous forms may have taken to gathering the populations of the bottom material and gaining more and more sustenance from the plant life until some have learned to tap the chlorophyll from filaments too large to ingest. It appears that the long slender pala of *Cymatia*, *Stenocorixa* and *Diaprepocoris* is more primitive than the broad spoon-shaped pala of those that gather micro-organisms, in which case the evidence indicates that early corixids were predaceous.

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[9] China, W. E. Ann. Mag. Nat. Hist., Ser. 10, Vol. XII, pp. 180-196.

[10] Tillyard, R. J. 1926 Amer. Jl. Sci., XI, p 382.

BRIEF HISTORY OF THE TAXONOMY OF THE CORIXIDAE

Linnaeus, 1758, described the first corixid under the name *Notonecta striata*. Geoffroy, 1762, proposed the generic name *Corixa* for a large species which he figured but misidentified as *N. striata* Linn. which is a smaller species. Fabricius, 1775, proposed the generic name *Sigara* for *N. striata* Linn. Illiger, 1807, in a work unfortunately long overlooked by Hemipterists, correctly used the name *Sigara* and identified *S. striata* (Linn.) as the small species with transverse lines, and showed how it differed in both size and color pattern from Geoffroy's *Corixa striata* which he renamed *C. punctata*. Leach, 1815, divided his tribe "Notonectides" into two families, Notonectida in which he placed *Notonecta* Linn. and Corixida in which he placed *Corixa* Geoffroy. He apparently considered *Sigara* Fabricius a synonym of *Corixa*. Then in 1817 † he again divided his tribe "Notonectides" into two families, one containing *Notonecta* and *Plea*, and the other *Sigara* and *Corixa*. In *Sigara* he placed *Sigara minutissima* (=*Notonecta minutissima* Linn.), having a distinct scutellum, and in *Corixa* he placed *C. coleoptrata* (Fabr.), *C. striata* * (Linn.) and added as new *C. stagnalis*, *C. fossarum*, *C. lateralis*, *C. dorsalis*,* *C. geoffroyi* and *C. affinis*. It is noteworthy that he separated the last two from the others by their glabrous hemeltyra and pointed out that *C. geoffroyi* was the species serving as the type of *Corixa* Geoffroy.

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† Leach, W. E. Trans. Linn. Soc. London, XII, Pt. I, pp. 10-18, 1817. I have seen this bibliographic entry dated 1818 but Van Duzee gives it 1817.

* China, 1938, reports that Doctor Jaczewski examined the Stephens collection in the British Museum. This collection was contemporaneous with Leach and if the determinations agreed with Leach, *C. striata* Leach = *C. sahlbergi* Fieber and *C. dorsalis* Leach = *S. striata* Linn.

Fieber, 1851, in his "Species Generis Corisa" gave an historical review of the literature and treated in this paper all of the Corixidae except the very small species with a distinct scutellum which, following Leach, he assigned to *Sigara.* Fieber's *Corisa* comprised fifty-one species, plus twenty other names of kinds he had not seen but one of which he renamed. It included *C. geoffroyi* Leach (= *C. punctata* Illig.), now recognized as the type of Geoffroy's *Corixa; C. coleoptrata* Fabr., the type of *Cymatia; C. praeusta,* the type of *Callicorixa; C. hyalinipennis* Fabr., now in *Agraptocorixa; C. verticalis,* the type of *Trichocorixa; C. germarii,* now in *Arctocorisa; C. kollarii,* now in *Centrocorisa;* and a species which he misnamed *C. carinata* Sahlb. which is a *Glaenocorisa.*

Thus Fieber's concept of *Corixa* was a broad one and his "*Corisa*" has been broken down into many generic and subgeneric groups by subsequent workers.

The name *Sigara,* however, following Leach, was applied to the very small corixids for many years. Then Kirkaldy, 1897, proposed for them the genus name *Micronecta* with *Notonecta minutissima* Linn. as the genotype and stated that *Corixa* Geoffroy, 1762, and *Sigara* Fabricius, 1775, were absolutely identical. Since Kirkaldy accepted Geoffroy's genera as valid and considered the genotypes the same, he thought he had disposed of *Sigara.* However, Schumacher, 1924, who did not accept the validity of the Geoffroy genera before 1775 again raised the question of "*Sigara* vs. *Corixa*" and concluded that *Corixa* Geoffroy was a synonym of *Sigara.* In this paper he called attention to Illiger's long-overlooked work of 1807 in which the *Corixa* figured by Geoffroy was named *C. punctata* and described as twice the size of *C. striata* and without transverse lines on its elytra. Thus *C. geoffroyi* Leach, 1817, is a synonym of *C. punctata* Illiger, 1807.

It has been our unwavering opinion: first, that Geoffroy's genera in *Histoire Abrégée des Insectes,* 1762, are valid and, second, that *C. striata* (Linn.) and *C. punctata* Illiger are not congeneric. We have taken no part in the published discussions of these questions but regret some of the proposals that have been made. It is gratifying to see that Mr. China, 1943, in his Introduction to "The Generic Names of British Hemiptera-Heteroptera . . ." recognizes that Opinion 46 of the International Commission validates Geoffroy's genera of 1762. Mr. China, 1938, plainly pointed out that the genotypes of *Sigara* and *Corixa* are not congeneric and that neither of the two genera can ever be synonymous with the other. While in his "Generic Names of British Insects" he tentatively accepted Walton's proposal to place all generic names except those of *Glaenocorisa* Thompson, *Cymatia* Flor and the *Micronectinae* as subgenera of *Corixa* Geoffroy, he recognized that such an arrangement might be rejected later. Moreover in "Some Remarks on Walton's Natural Classification of the British Corixidae," 1943, in *The Entomologist's Monthly Magazine*, Vol. LXXIX, pp. 109-111, Mr. China points out that the relegation of *Sigara* Fabr. as a subgenus of *Corixa* Geoffr. by Walton in no way disposed of the question he had discussed in his 1938 paper. Whether as genera or as subgenera the genotype of *Corixa* is *C. punctata* Illiger and that of *Sigara* is *C. striata* (Linn.).

We maintain that both represent good genera. Even Leach, 1817, without noting the sinistral asymmetry of the males of his *C. geoffroyi* and *C. affinis*, separated them from the other corixids by their glabrous hemelytra, and Fieber, 1851, on the same character, placed *C. geoffroyi* Leach and his own *C. xanthosoma, C. panzerii, C. atomaria* (= *C. affinis* Leach), *C. macrocephala* (= *C. panzeri* Fieb) and *C. platycnemis* together. Whether Fieber did not try to establish any related groups based upon closer affinities between the different species of Corixidae as stated by Jaczewski or did attempt to do so, I do not know. Nevertheless, his interpolated key characters did bring some other related species together also as, for example, *C. verticalis, C. pygmaea* and *C. burmeisterii*, now in *Trichocorixa*, and *C. bonsdorfii* Sahlb. and *C. coleoptrata* Fabr., now in *Cymatia*.

Flor, 1860, proposed *Cymatia* as a subgenus, and Douglas and Scott, 1865, raised it to generic rank. Thomson, 1869, noted that the *C. geoffroyi* group had the copulatory apparatus directed to the left and proposed for it the subgenus *Macrocorisa* which must be recognized as a synonym of *Corixa*. He also proposed the subgenus *Glaenocorisa*.

Up to this time we find the characters used in the taxonomy of Corixidae were those set forth by Fieber. This author knew that there is sexual dimorphism of the abdomen and pala, and used the shape of the pala, the facial impressions and their pilosity, the rastrate or nonrastrate surface of the pronotum and hemelytra, the pilosity of the hemelytra, the shape of the pronotum, with or without carina, the shape of the metaxyphus and color pattern. Undoubtedly he gave too great importance to color. Unfortunately the species Fieber studied and figured to show the asymmetry of the male abdomen was his *Corisa praeusta* which lacks a strigil. As a result it was Buchanan White, 1873, who was the first to discover and describe the strigil in twenty species, to point out that in the males of *Macrocorisa* Thomson the strigil is on the left side, and that in the *C. praeusta* Fieber group and in *Cymatia* there is no strigil. For the *C. praeusta* group he proposed the name *Callicorixa*. He also named the genus *Oreinocorixa*, which is a synonym of *Glaenocorisa* Thomson. White's study of the strigil was an important contribution to the taxonomy of the Corixidae. Then Kirkaldy (1901-1903) studied and figured the arrangement of the pegs on the male pala of twenty-three species of Corixidae, demonstrating that the number and arrangement of the pegs had specific value. He also figured the pala of *Cymatia* and of *Micronecta* and illustrated the field of pegs on the femur of the male of *C. geoffroyi* Leach. Since then the discoveries of White and Kirkaldy have been used in describing new species of Corixidae. Kirkaldy's work from 1897 to his untimely death in 1910 had a marked effect on corixid taxonomy. His use of generic names was followed by other workers for a considerable time. He used *Corixa* Geoffroy for sinistral species; *Arctocorisa* Wallengren for dextral species with a strigil; *Callicorixa* White for dextral species without a strigil; *Cymatia* Flor, and *Glaenocorisa* Thomson. He proposed the following names for new genera or subgenera: *Diaprepocoris* 1897, *Micronecta* 1897, *Agraptocorixa* 1898, *Trichocorixa* 1908, and *Hesperocorixa* 1908. There were also known in Kirkaldy's day the following: *Heterocorixa* White, 1879, and *Tenagobia* Bergroth, 1899.

Abbott (1912-1916), in the short time he studied North American Corixidae, added the genera *Ramphocorixa* and *Palmacorixa* and described a total of 17 species, 6 of which are synonyms. He followed Kirkaldy in using *Arctocorixa* for most dextral American corixids, but either ignored or overlooked Kirkaldy's proposal to establish as a subgenus of *Arctocorisa* the name *Trichocorixa* for the small American species with *C. pygmaea* Fieb. as genotype (a synonym of *C. verticalis* Fieb.), and used the name *Corixa* for them instead because the males are sinistral. No new structural characters were discovered by him. With Abbott's withdrawal from biological work to become commercial attaché in the American embassy in Tokyo, Japan, I found it necessary to undertake the determination of American Corixidae myself. During the winter of 1916-'17 at the suggestion of H. H. Knight, who was finding the male genitalia of Miridae useful in species fixation, I explored the possibilities of these structures in Corixidae and various other aquatic and semiaquatic Hemiptera and found them useful. In 1920, in a paper entitled "The Male Genitalia as Characters of Specific Value in Certain Cryptocerata" which appeared in the University of Kansas Science Bulletin, Volume XI, I stated that I was engaged in preparing a monograph of the Corixidae and that drawings of their genital parts would appear later. The paper was presented to call attention to the possibility of using the genitalia of the males of some of the aquatic and semiaquatic Hemiptera, a line of characters not hitherto used, in their taxonomy. In this paper I wrote: "A searching examination of some of the related families has shown some of them to possess quite specifically distinct genital characters. The males of Gelastocoridae, Notonectidae and Corixidae have genital claspers attached to a capsule-like segment which is capable of being withdrawn into the body and thus lies hidden. This strongly chitinized capsule is but loosely attached to the body wall and can therefore be drawn forth and removed from the bug *in toto* without the least injury or mutilation to the external features of the specimen." Jaczewski, 1921 (and Gajl) in Rozpr. i Wiad. z Muz. Dzied. Lwów 5/6 1919/1920, pp. 142-150, in discussing the difference between *Arctocorisa scotti* D. and S. and *A. fossarum* (Leach), figured the right genital claspers of the males. Lundblad, 1923, in Annales de Biologie Lacustre XII, p. 307, called attention to the taxonomic value of male genitalia of Corixidae and the abdominal segments and figured these parts in comparing *A. prominula* (Thoms.) and *A. fossarum* (Leach). Then came Jaczewski's splendid paper on the "Revision of the Polish Corixidae" 1924. In his work he gave due attention to characters already in use, such as the facial impression of the males, the pubescence of the face in both sexes, the greater or smaller prominence of the eyes and their distance from the posterior margin of the vertex, the length of the head as seen from above compared with the length of the pronotum, the shape of the male pala and its peg arrangement, the shape of the metaxyphus, which he used more precisely than did Fieber, and the male abdomen and its strigil. In addition he made a number of useful contributions to the taxonomy of the Corixidae. He figured the right or left clasper of the male genital capsule of each species which is an excellent aid in identifying it. He found that the relative length of the last two antennal segments have taxonomic value;

that the front legs of the males, beside their palae, may have other characteristics such as the pubescence of the trochanter, the hairs and pegs on the anterior surface of the femur, the spiniform bundle of hairs on the apex of the tibiae and some others. He gave the relative length of the various segments of the middle and hind legs and called attention to the short spines on the upper surface of the hind femora. He gave special attention to the shape of the lateral lobes of the prothorax and was able to use this character in setting up the subgenus *Anticorixa.* Certainly Jaczewski's *Revision of the Polish Corixidae* not only paved the way for further study of European Corixidae but has been helpful in other lands as well. He recognized the genera *Cymatia* Flor, *Glaenocorisa* Thomson, *Corixa* Geoffrey and used *Callicorixa* B. White to include both *Callicorixa* and *Arctocorisa* of authors. He then arranged the sixteen Polish species belonging to *Callicorixa* (sens. lat.) into four groups: Group *fossarum,* Group *concinna,* Group *limitata,* and Group *sahlbergi.* Under "Incertae sedis" he placed *C. fabricii* (Fieb.), *C. striata* (L.), *C. praeusta* (Fieb.), and *C. hellensi* (C. Sahlb.). Why there should have been anything uncertain about *C. praeusta* (Fieb.), I do not understand. It is the genotype of *Callicorixa* B. White and his addition of the subgenus *Anticorixa* for his Group *sahlbergi* under *Callicorixa* obligates the use of *Callicorixa* also as a subgenus which fixes the position of *C. praeusta* (Fieb.). The correctness of his groups is indicated by the subsequent proposal of *Subsigara* by Stichel, 1935, for his Group *fossarum;* of *Vermicorixa* by Walton, 1940, for his Group *concinna;* and of *Retrocorixa* Walton, 1940, for his Group *limitata.*

We now have several additional subgeneric names to designate other groups of this same generic complex; for example, *Parasigara* Poisson, 1935, *Halicorixa* Walton, 1940, *Tropocorixa* Hutchinson, 1940. This still leaves us with a number of unnamed groups with better definition than several of those already named and a considerable number of species that are more distinct, one from another, than are the named groups. Must each of these then have a subgeneric name assigned to it? What advantage is such a plan over the group designation of Jaczewski when it is impossible to make a really workable key to poorly defined subgenera? I have no satisfactory answer to these questions, but to be consistent with the pattern already set, one must name them all.

In subsequent years Jaczewski corrected certain errors of his 1924 paper. In 1927 he replaced his *Callicorixa* (*sens. lat.*) by *Sigara,* revised his groupings in 1929, and has contributed substantially to our knowledge of Corixidae, including two good papers on his own collections in Brazil, S. A., and in Mexico.

In 1916 Doctor O. Lundblad began his valuable and well illustrated contributions on Corixidae including not only his "Studien über Schwedische Corixiden" (1925 to 1928) but the reëxamination, redescription and adequate drawings of Fieber and other types, previously inadequately known, and the description of new species from both hemispheres. He not only used both claspers and the male genital capsule but called attention to useful characters in previously described species that had been overlooked. Indeed the third decade of the twentieth century marked the beginning of renewed interest in the Corixidae. Besides the writings of Jaczewski and Lundblad, H. M. Hale, 1922, reported his study of the Corixidae of Australia, proposing a new genus and describing new species. Hutchinson, 1929, revised the Notonectidae and Corixidae of South Africa. In 1925 I began a series of paper on new Corixidae, and in 1928 spent the year in European museums examining types in preparation for this paper. Poisson, of France, also published his first corixid paper in this decade as did Walley of Canada. More recently, 1943, Walton of England has proposed "A Natural Classification of the British Corixidae" in which he proposed to submerge *Sigara* Leach, *Callicorixa* White, etc. as subgenera of *Corixa* Geoffroy. Thus anyone interested in a world catalogue of Corixidae has had a perplexing problem. From 1924 to 1927 some new species were described under *Callicorixa* (*sens. lat.*) and in the following years under *Sigara*, while I was still describing species under *Arctocorixa*, following both the spelling and the concept as accepted by Van Duzee in his catalogue. I never accepted *Callicorixa sens lat.* as proposed by Jaczewski, 1924, and my use of *Sigara* in recent years has not been with the thought that it included *Callicorixa*. I agree in general with Lundblad's concept of *Callicorixa* B. White as expressed in his "Studien über Schwedische Corixiden" VI, 1927, and our position on other groups will be indicated elsewhere.

In this present paper we have used only such characters as appear to have any significance in describing a given species. We have introduced some new characters for the separation of subfamilies such as the presence or absence of the embolar groove in the hemeltyra, the presence or absence of the nodal furrow, the position of the media vein in the hemeltyra, and the position of the hypo-ocular suture; for the separation of tribes, the shape of the metathoracic episternum; for the separation of genera, the width of the infraocular portion of the head, the shape of the face and beak, the inner angle of the eyes, the pruinose areas of the claval suture, and the shape of the eighth abdominal sternite in the females; for the separation of species, the shape of the mesoepimeron, the position of the scent gland orifice, the length of the pruinose area beyond the nodal furrow, the relative length of the meron, and the shape of the lateral lobes of the eighth abdominal segment in the female. All other characters used in our keys have been employed previously.

Since this is a paper dealing with the Corixidae of the Americas, some historical facts should be noted. The first corixid to be described from the new world was *Notonecta lineata* Förster, 1771, a longitudinally striped little species from Canada and the Great Lakes area. The second was *Corixa nigripennis* Fabricius, 1803, from Insular America. Then Thomas Say, 1825-1832, described five species from North America. Kirby, 1837, named one from Canada. Le Guillou, 1841, described one from Chile, S. A., and Guérin-Méneville, 1844-1857, named four species from Insular America and Mexico, one of which is a synonym. Herrich-Schaeffer, 1850, described one species which is a synonym. Fieber, 1851, made a substantial contribution to American Corixidae by describing thirteen species, three of which are synonyms, thus doubling the number of species known from the new world. Spinola, 1852, described one species. Heer, 1853, in a publication long overlooked, described a species from northwestern United States. Stål, 1859, named two species, one a synonym. Uhler, a well-known American Hemipterist, described, between 1875 and 1897, a dozen species from the United States, one of which is a synonym. During this time Buchanan White, 1877-1879, described one species from Hawaii and six species and one variety from South America, for one of which he proposed the new genus *Heterocorixa*. Only three of his *Tenagobia* have proved to be good species and his Hawaiian species is a synonym. Signoret, 1885, named one South American species and Breddin, 1897, another. Kirkaldy, 1899-1908, described five species and renamed another. Three of his species were from North Carolina, one from Ecuador and one from Costa Rica. Champion, 1901, named six corixids, one of which had to be renamed, and two are synonyms. Abbott, 1912-1916, proposed two new genera and described seventeen North American species, six of which are synonyms. Torre-Bueno, 1918, described a new species from Antigua which proved to be a synonym. Hussey, 1920, described a new species of *Cymatia from* Minnesota. Hungerford, 1925, to and including this paper, has named 104 species and 6 subspecies. Two of these are synonyms. Blatchley, 1926, who admittedly did not know the Corixidae but was forced to do the best he could with them in his well-known *Heteroptera of Eastern North America*, described two species, both synonyms. Lundblad, 1928-1931, has described eight species and one variety (raised by Deay to specific rank), all from South America. This includes two synonyms. Jaczewski, 1927-1933, has named seventeen species and two varieties, of which three species are synonyms. Walley, 1930-1936, named twelve species and one variety. Three species are synonyms. Deay, 1930-1935, monographed the genus *Tenagobia* and described six species of which one has turned out to be a synonym. Sailer, whose monograph on the *Trichocorixa* is included in this paper, names seven new species and three subspecies. He is also co-author with Hungerford on another species. Miss Egbert has described one new species in the *Ant corixa* group (*Hesperocorixa*) and has brought to my attention several others described in this paper. There are, therefore, known to date, 209 species of Corixidae and 12 subspecies from the Americas. Of these, 137 species and 9 subspecies are from North America, 14 species from Insular and Central America, and 58 species and 3 subspecies from South America and the Galapagos.

CONCERNING GENERIC CONCEPTS IN CORIXIDAE

In Hutchinson's "A Revision of the Corixidae of India and Adjacent Regions," 1940, is included G. A. Walton's "Classification of the Family" in which Walton proposed to place the following as subgenera of *Corixa*: *Arctocorisa* Wall., *Callicorixa* B. White, *Neosigara* Lundbl., *Heliocorisa* Lundbl., *Sigara* F., *Subsigara* Stich. and *Parasigara* Poiss. Then he proposed three more subgenera: *Vermicorixa, Halicorixa* and *Retrocorixa*. This was apparently acceptable to Hutchinson, but such a sketchy, hastily-drawn proposal, unsupported by convincing evidence that *Corixa* Geoffroy and *Sigara* Fabr. are congeneric, and such "lumping," further weakened by the inconsistent "splitting" of Diaprepocorinae in the same paper seems to me ill-advised. Perhaps the uncertain future of the war years are responsible for Walton's brief note in Hutchinson's 1940 paper, and also for his "Natural Classification of the British Corixidae," 1943, in *The Transactions of the Society for British Entomology* (Vol. VIII, Pt. 5, pp. 155-168) in which he proposes to unite in the *same* genus such utterly different genera as *Tricho-*

corixa and *Graptocorixa* and yet in the same paper separates the Diaprepocorinae into tribes! The entire paper is written with an air of authority and an assumption of knowledge that is not justified. Mr. W. E. China, well-known hemipterist of the British Museum, in "Some Remarks on Walton's 'Natural Classification of the British Corixidae'" in *The Entomologist's Monthly Magazine*, Vol. LXXIX, pp. 109-111, analyzes this paper and reduces Mr. Walton's new contributions or "innovations" to their proper place in order that the record may be correct and that Doctors Jaczewski, Lundblad and Poisson may receive the credit due them. All of these men are sincere and able students of the Corixidae, with considerably more experience than had the author of "The Natural Classification of the British Corixidae." I am sure that all of these men, as well as I, would have welcomed a really helpful contribution. Mr. China, whose taxonomic experience in Hemiptera is wide, was not writing as a student of the Corixidae, and therefore it is necessary for me to call attention to some statements and implications that need correction or question.

Mr. Walton says in his opening paragraph: "Karyological investigations have now been made in over a dozen species of Corixidae. *Cymatia* has a diploid chromosome number of twenty-six, while all other studied species have twenty-four. I will endeavor to show that all of these latter species happen to belong to the same genus. (For chromosomes see: 1933 Prokofiewa, *Zeitschr. f. Zellforsch und Mikroskop. Anat.*, 18: 1-27;* Poisson, 1936, *Arch. Zool. Exp. et Gén.*, 78: 133-194, pl. 2-4; and Slack, *Proc. Roy. Soc. Edinburgh*, 58: 192-212.)" Prokofiewa, 1933, studied the chromosome number and arrangement in the following eleven species of Corixidae: "*Corixa distincta* Fieb., *C. striata* L., *C. fossarum* Leach, *C. falleni* Fieb., *C. fabricii* Fieb., *C. semistriata* Fieb., *Callicorixa praeusta, Callicorixa wollastoni* Dgl. Sc., *Corixa sahlbergi* Fieb., *Corixa linnei* Fieb. and *Macrocorixa dentipes* Thoms." He concluded from his studies that the first eight species comprised one group; *C. sahlbergi* Fieb. and *C. linnei*, a second group; and *Macrocorixa dentipes*, a third group. It is interesting to note that he had represented in his Group I: *Sigara* (*Sigara*) *striata* (L.); *Sigara* (*Subsigara*) *fossarum* (Leach), *S.* (*S.*) *distincta* (Fieb.), *S.* (*S.*) *falleni* (Fieb.); *Sigara* (*Retrocorixa*) *semistriata* (Fieb.); *Sigara* (*Vermicorixa*) *nigrolineata* (Fieb.) (= *fabricii* [Fieb.]); also two species of *Callicorixa*. In his Group II were two species of *Anti-*

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* I find that this should be Vol. 19 instead of 18

corixa Jacz. and in his Group III, *Corixa dentipes* (Thoms.). His studies, so far as they go, would indicate that both *Anticorixa* and *Corixa* are distinct and that his first group is a mixed lot, rather more related to each other than to *Anticorixa* and *Corixa.* This evidence is against Mr. Walton's proposal rather than in support of it.

Before making such sweeping generalizations as indicated by Mr. Walton, there should be a careful analysis of the material in the references cited and a background of familiarity at least with *Genetics and the Origin of Species* by Dubzhansky, with *The New Systematics*, by Huxley, and with *Systematics and the Origin of Species,* by Mayr.

Doctor Slack, 1938, in his work, reported that he studied the following nineteen species: "*Corixa punctata* Illiger, *Corixa dentipes* Thoms., *Sigara linnaei* Fieb., *S. striata* Fieb., *S. distincta* Fieb., *S. falleni* Fieb., *S. castanea* Thoms., *S. semistriata* Fieb., *S. fabricii* Fieb., *S. fossarum* Leach, *S. scotti* Fieb., *S. carinata* Sahlb., *S. germari* Fieb., *Callicorixa praeusta* Fieb., *Ca. wollastoni* D. & S., *Ca. caledonica* Kirk., *Ca. concinna* Fieb., *Glaenocorisa cavifrons* Thoms. and *Cymatia bonsdorffi* Sahlb." Thus he examined the genera *Corixa, Sigara, Callicorixa* and *Glaenocorisa*, which have the diploid number of twenty-four chromosomes, and *Cymatia bonsdorffi,* which has twenty-six. Since Mr. Walton recognizes *Glaenocorisa* as a good genus, his statement above is not quite true. Surely the presence of the same number of chromosomes in two genera does not make it necessary to unite them. Doctor McClung and his students here at the University of Kansas many years ago found a number of genera of Orthoptera with the same number of chromosomes. They are still good genera.

On page 157 Mr. Walton says, "The Corixinae I have also divided into a predatory tribe, the Cymatiini, and a microphytic tribe, the Corixini, using the anterior tarsus combined with the mouth parts as the indicative characters, and this division is confirmed by studies of their feeding habits." A rather broad statement in view of the fact that the feeding habits of many species and even genera have not been observed. How predominately predatory the Cymatiini are, I do not know. In the next paragraph, "There are only eighteen good genera in the whole family, and of these, seven are monospecific, while with the exception of four, none of the other genera contain more than ten species." What, according to Walton, are the eighteen good genera? He does not say.

According to my figures there are forty-seven names that have been proposed for genera or subgenera of Corixidae. Of these, five are synonymous and of the remaining forty-two, twelve have never been used beyond subgeneric rank. This leaves thirty names that have been used as generic names but Mr. Walton assures us with confidence that there are "only eighteen good genera." What are they and what is his disposition of the remainder? He says seven are monospecific. A glance through our card catalogue shows that while many names were monospecific at time of proposal, only ten are still so. Of these ten we find he places *Trichocorixella* Jacz. under *Trichocorixa* Kirk., where it does not belong, and *Neosigara* Lundb. and *Heliocorisa* Lundb. under *Corixa* where, according to my judgment, they do not belong. This leaves seven monospecific genera but still leaves us wondering if Mr. Walton has overlooked the additions to former monospecific genera. If so, then we cannot positively identify his "good monospecific genera." It is clear that he accepts *Micronecta* Kirk. and *Tenagobia* Bergr., *Trichocorixa* Kirk. and *Corixa* Geof. He says the genus *Trichocorixa* Kirk. includes "the genera *Corisella* Lundblad, *Graptocorixa* Hungerford, *Trichocorixella* Jaczewski, *Palmocorixa* Abbott, *Centrocorixa* Lundblad, *Krizousacorixa* Hungerford, *Morphocorixa* Jaczewski, and perhaps *Ectemnostegella* Lundblad." *Morphocorixa*, by the way, was not proposed as a genus. If *Ectemnostegella* Lundblad, then why not *Ectemnostega* Enderlein? If *Graptocorixa* Hungerford, then why not *Neocorixa* Hungerford? I cannot accept any of this proposal.

The genus *Trichocorixa* Kirkaldy, as Doctor Sailer treats it, is as neat and precise a generic group as can be found. The sinistral asymmetry of the males which is so stable that only four cases of reversal have been found in some 5,000 males, the common form of the male front leg in all species, the position of the nodal furrow in the females and other characters enable one to place these uniformly small corixids in a distinct generic unit. By Mr. Walton's treatment of the Diaprepocorinae, *Graptocorixa* belongs to a different tribe, not to the same genus as *Trichocorixa!* All of the above-mentioned genera are so arranged in our keys that our position regarding them is clear. To say that "all these groups are confined to central and southern America" is not true for *Trichocorixa* and *Corisella* reach well into Canada.

Mr. Walton's attempt to separate his tribe Corixini into two groups is neither successful nor useful. When he proposes to place "some 330 species" in these two groups which he calls the genera *Trichocorixa* and *Corixa,* which he cannot separate precisely, he has added confusion and stopped the student who has Corixidae to determine before he gets started! It does not seem to me that it takes thirty years of experience with Corixidae from all over the world to see the nonutility of such a proposal.

It will be noted below that he disposes of nine generic names under his *Trichocorixa,* six under his *Corixa* and makes no disposition of *Ectemnostega, Pseudocorixa, Callicorixa, Arctocorisa, Hesperocorixa, Anticorixa, Neocorixa* and *Tropocorixa.* Thus he takes liberties with fifteen names and ignores eight others.

His Group I, he says, contains forty species and must be called *Trichocorixa* and contains as subgenera: *Corisella, Graptocorixa, Trichocorixella, Palmacorixa, Centrocorisa, Krizousacorixa, Morphocorixa* and perhaps *Ectemnostegella.* Here is his *Trichocorixa* described:

I. "The hemielytral markings are *generally* curiously ragged, and there is *often* no line of demarcation between the corium and the membrane."

II. "There is usually a narrow space between the eyes and the posterior margin of the head and while the males are pleomorphic in their secondary sexual characters, they generally show the anterior tibia produced over the pala and the presence of hairs modified as pegs in the middle row of sifting hairs."

How precise and accurate a picture does the above give of his *Trichocorixa* as a generic concept? Read again his "I" statement. The hemelytral markings are very distinct in *Graptocorixa* and some species have the membranal line distinct. All of the *Corisella* have the membranal line present. So do *Krizousacorixa* and *Centrocorisa* and it is visible in *Morphocorixa.* Five of the nine genera do not fit his statement "I." Now read again his "II" statement. He means that the postocular space is broader than it is in his *Corixa.* The postocular space is narrow in *Centrocorisa, Corisella,* and *Morphocorixa,* and in *Trichocorixa* and *Palmacorixa* no wider relatively than in *Corixa* and *Sigara.* Again five of the nine genera do not fit. Referring to the males he says: ". . . they generally show the anterior tibia produced over the pala and the presence of hairs modified as pegs in the middle row of sifting hairs" The anterior tibia of the males is not produced in *Graptocorixa, Palmacorixa, Krizousacorixa, Morphocorixa* and *Ectemnostegella.* Thus five of the nine genera do not fit. The following do not have pegs in the middle row of sifting hairs: *Graptocorixa* and *Palmacorixa.* In *Corisella* and *Centrocorisa* the peg rows are above the row of sifting hairs, while *Neosigara,* which Walton places under *Corixa,* does have pegs in the row of sifting hairs. In *Krizousacorixa* and *Morphocorixa* one species of each genus has pegs in the row of sifting hairs and the other does not. In *Trichocorixa sens. str.* there are no pegs in the row of sifting hairs. This statement, with its many contradictions, then has no significance.

His Group II, which he proposes to call *Corixa,* "includes the genera at present known as *Corixa* and *Sigara, Parasigara* Poisson, 1935, *Rhamphocorixa* Abbott, 1912, *Neosigara* Lundblad, 1928, and perhaps the Southern Mediterranean species *Heliocorisa* Lundblad, 1928, *vermiculata* Puton, the only Old World species which approaches *Trichocorixa.*" This group contains, according to Mr. Walton 330 minus 40 or 290 species. "The characters which separate this genus from the *Trichocorixa* are as follows: Hemielytral markings definite even if vermiculate; always a line of demarcation between corium and membrane; space between eyes and posterior margin of head very narrow or absent; anterior tibiae never produced over the tarsus; never any hairs modified as pegs in the middle row of sifting hairs." Let us examine the genera he assigns to *Corixa* in the light of his description. "Hemielytral markings definite even if vermiculate." *Ramphocorixa* surely has most indefinite markings. See Plate V, figs. 17 and 18. "Always a line of demarcation between corium and membrane." If this is true then *Corixa sens. str.* does not belong here. *Neosigara* has the line but faintly visible and would be doubtfully placed here. *Hel ocorixa* does not have the membranal line present. Thus three of his six genera do not fit this statement. "Never any hairs modified as pegs in the middle row of sifting hairs." Then *Neosigara* does not belong here.

In reviewing Mr. Walton's descriptions of his *Trichocorixa* and *Corixa,* one wonders why he mentions the shape of the male tibia and the peg arrangement of the male pala when he had previously written: "From the start it was realized that those so very complicated sexual characters of the male which have been given such prominence by past workers must be largely disregarded . . . ." On page 158 under the subheading, "A Few Words on the Genera *Corixa* and *Sigara,*" Mr. Walton devotes four and a half pages to this subject. In this he does not recognize Geoffroy's work of 1762 as valid, but apparently admits that Müller, 1764, did validate Geoffroy's genera. He takes Mr. China to task for stating in his 1939 paper on this same subject that *Corixa* Geoff. and *Sigara* F. are not congeneric. Yet Mr. China was perfectly justified in his statement which was based upon the work of Jaczewski, Lundblad, Poisson, Stichel and Hedicke.

It is also my position that *Corixa* and *Sigara* are not congeneric. Obviously, it is a question of the generic concept. A genus is usually considered to be an assemblage of species agreeing in some one character or series of characters and comprising closely related species. The criteria used in determining close phylogenetic relationships vary in different groups and their relative value in any one group may be subject to debate. In Corixidae we have the questions of the asymmetry of the males and the presence or absence of a strigil for example. Mr. Walton argues that the large, smooth species with sinistral asymmetry belonging to the genus *Corixa* Geoffroy are congeneric with the smaller, usually rastrate, species with dextral asymmetry that comprise the genus *Sigara* Fabr. He ridicules all of us who consider them generically distinct as "gullible followers" of Linnaeus, Geoffroy and Fabricius, and states: "Now in the light of modern knowledge Group B (*Sigara*) contains a number of species of Group A (*Corixa*), the only difference being the reversal of the segmental asymmetry of the abdomen of the males. In Europe it so happens that these related species from the two groups are about equal in numbers (and appear to be the real reason for the long muddle). However, an intermediate species *Corixa mirandella* Hutch. (a Glacial relict)* is found in Africa, and this, while being 8-8.5 mm. long, has faintly roughly sculptured pronotum and hemielytra and has *left*-sided asymmetry. In North America there are 14 species belonging to this group, but these are large and smooth with *right*-sided male abdominal asymmetry. Some of them like *C. mirandella* are slightly rough. One called *C. laevigata* Uhler occurs regularly with the asymmetry directed to *either* side! Moreover such a reversal has been recorded in the Eurasian large smooth species; a male of *C. affinis* from Egypt was found by Jaczewski to have the abdominal asymmetry directed to the right (1924 Ann. Mus. Zool. Polon. Hist., Nat. *3*: 83 †). There is another interesting North American species which, while being very large, has a rough sculpture and right-sided abdominal asymmetry. Structurally this so-called *Hesperocorixa kennecottii* Uhler (= *C. brimleyi* Kirk.) is a large example of the group of smaller species, nothing else. Moreover the diploid number of chromosomes is the same for all species of this group so far studied."

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* Hutchinson, 1930, used the term "Pluvial relict."

† This reference is incorrect.

Mr. Walton's assertion that *Corixa* and *Sigara* are congeneric is based upon two or three observations made by others who were *not* convinced that the facts necessitated the union of the two genera. While Doctor Jaczewski (1924), who proposed the *Anticorixa*, stated that "the species belonging to it represent to a certain degree a mirror-inversion of those of the genus *Corixa* Geoffr.," he nevertheless made it a subgenus of his *Callicorixa* (=*Sigara sens. lat.*). In 1928 I reported cases of reversed asymmetry in *Arctocorixa edulis* (Champ.) [= *Corisella edulis* (Champ.)] and since then have published studies in other species. In describing *Corixa williamsi*, 1928 [a synonym of *Sigara griffini* (Kirk.)], I had two males that were sinistral and one that was dextral. In 1939 I studied a long series of this species and found six dextral males in 751 males. In *Trichocorixella*, which Jaczewski described as sinistral, I found (1942) that of sixty males, twenty-four were sinistral and thirty-six dextral.

Jaczewski, 1931, reported five cases of reversal in twenty-six males of *Krizousacorixa femorata* (Guérin). In our own collection of this species we have 262 males of which 79 are sinistral and 183 dextral. Poisson, 1935, reported three males of *Corixa affinis* and seven males of *Sigara sahlbergi* with reversed asymmetry. Jaczewski, 1936, reported a reversed male, *Corixa affinis* from Africa. In our own collection we have a male of *Corixa punctata* Ill. from Wmldn., England, that is dextral. The other males from the same place are sinistral. With the hundreds of European Corixidae examined, the sinistral male pattern must be well established in *Corixa* and the dextral male pattern quite stable in *Sigara*. In such groups I think the character has generic significance and is useful. In *Krizousacorixa* and *Trichocorixella*, cases of reversal are frequent but other characters define these genera. In *Pseudocorixa* we have one species that is sinistral and several that are dextral. Thus I consider that the direction of the asymmetry in male Corixidae may have generic significance or it may not. In the Gastropods also the asymmetry of the shell may be a family character or it may not be even a specific character.[‡] Even in species belonging to families that are dextral you now and then find a sinistral specimen. I mention the Gastropods because Walton states, "It is only too obvious that this occurrence of reversal of asymmetry is largely a matter of chance, and has much the same significance as the reversed spiral found in the Gastropoda, and Dextrocordia in the Mammalia . . ." The direction of the spiral in the shell of the Gastropod is determined by the structure of the animal itself and its significance varies as stated by me above. As for "Dextrocordia" in mammals there is indeed no more significance in it than in the occasional dextral *Corixa* or sinistral *Sigara*.

[‡] *Limnaea peregra* for example

Walton states that in Europe the two groups are about equal in number. If he is comparing *Corixa* with its sinistral males and *Sigara* with its dextral males, the statement is not true.[¶] I know of but eight or nine species of *Corixa sens. str.* and its known distribution is from the British Isles across Europe and North Africa to India, a spread but little greater than that of *Corixa punctata* Illig., the type species of the genus. *Sigara*, on the other hand, is represented by one or more groups on all the continents. It is this *Sigara* complex that is made up of some groups that are quite well defined and have been given names such as *Callicorixa* B. White *sens. str.*, *Arctocorisa* Wallengren *sens. str.*, both of which are Holarctic and Alpine in distribution; *Anticorixa* Jaczewski, which is equal to *Hesperocorixa* Kirkaldy, is Holarctic, and *Morphocorixa* Jaczewski, which includes two species from southwestern North America. In the above four groups the females as well as the males can be unerringly placed. Then we have some named groups the males of which fit a common pattern but their females have so far defied a group description such as *Sigara Sigara* Fabr., *Sigara Subsigara* Stichel, *Sigara Vermicorixa* Walton, *Sigara Retrocorixa* Walton, *Sigara Halicorixa* Walton, *Sigara Parasigara* Poisson, and *Sigara Tropocorixa* Hutchinson. *S. Subsigara,* named for the *fossarum* group of Europe, has one species in the United States. *S. Tropocorixa,* which Hutchinson named for *S. promontoria* (Dist.), occurs in New Zealand, Australia, Tasmania, India, Madagascar, Africa and South America. While there are only three corixids recorded for New Zealand, one is *S.* (*Tropocorixa*) *arguta* (White), and in the other regions mentioned above there is an increasing proportion of the species of the *Sigara* complex that belong to the *Tropocorixa*. In addition to the named groups, some of which are ill-defined, there are other unnamed assemblages of species and many individual species that differ from each other more than some of the named groups do.

Mr. Walton's statement that the American species "*C. laevigata* Uhler occurs regularly with the asymmetry directed to *either* side" is a surprise to me. We have 600 males of this species from many places and only two sinistral specimens! His statement that there are fourteen species of North American Corixidae that are large and smooth with right-sided male abdomens is not quite true. There is only one that is quite smooth and that is *C. laevigata* Uhler, but even this shows some rastrations, and the females of this species are easily separated from the females of Européan *Corixa*.

[¶] I think, however, that he was comparing *Corixa* and *Anticorixa* and it would have been clearer to have so stated.

Doctor Jaczewski has pointed out that *Corixa sens. str.* has a single row of short spines on the dorsal surface of the hind femur. In *Anticorixa,* if spines occur on the dorsal surface of the hind femur they are not so arranged. Miss Addie Egbert, in an unpublished Master's thesis here at the University of Kansas, has made a careful study of *Corixa* and *Hesperocorixa,* and has found that the media vein in the hemelytra of *Corixa* species nearly always ends or fades out before it reaches the nodal furrow, while in *Hesperocorixa* (= *Anticorixa*) it nearly always unites with the nodal furrow. All of the males of *Corixa sens. str.* have the penial sheath curiously modified which is not true for the males of *H. laevigata* (Uhl.) or any other *Hesperocorixa* studied. I may add, since Mr. Walton mentions the species, that we have studied a series of *Corixa mirandella* Hutchinson from the type locality and that definitely the species belongs to *Corixa*.

The argument that "broad-minded entomologists when writing on Corixidae have often used the generic name *Corixa* to cover all British species not belonging to *Cymatia, Glaenocorixa* or *Micronecta* in order not to commit themselves over this confusing issue . . ." has no more weight than to say that Fieber called everything *Corixa,* except the *Micronecta*, including *Cymatia, Glaenocorisa* and *Agraptocorixa* which even Mr. Walton can recognize as good genera. As in most other families, many of the generic names were first proposed as subgenera and later accepted as genera, such as *Agraptocorixa* Kirk., *Cymatia* Flor and *Glaenocorisa* Thoms. which were proposed as subgenera of *Corixa*. If there were uniformity of criteria for genera in Insecta, we would have a guide. However, there is none and generic values vary from family to family.

The use of subgeneric names is frowned upon by many taxonomists, yet I must confess that *Tropocorixa* Hutchinson, which stands as a subgenus of *Sigara* because I cannot, at present, positively define the females, is a useful name. As Mayr, 1942, has stated, "The genus is based on the fact that the species are not evenly distinct from one another, but are arranged in smaller or larger groups, separated by smaller or larger gaps. The genus is therefore based on a natural phenomenon. How many of such groups are to be included in one genus and how the genus should be delimited from other genera are matters of convenience, to be left to the judgment of the individual systematist. The genus of the systematist is his own artificial creation and not a natural unit."

The arrangement of what appear to be closely related species into groups is a matter of great convenience. Such groups, when possible, should not be large and unwieldy, necessitating further group names. In the Corixidae, if such a phylogenetic group of species has in common a general facies and structural characters that enable one to assign both males and females to the group we are giving it generic rank. In some cases the pattern of geographical distribution may be an additional factor in reaching such a conclusion. If it is not possible to do this, we are leaving it as a subgenus, if already named, within the genus to which it appears related.

In most genera the species are much alike but in *Sigara* Fabr. we have a wide assortment of species that are obviously not as closely related as they should be to belong to the same genus; yet we are leaving them there until usable group characters are found that would give them recognizable generic rank. I would have been quite content to have referred to these assemblages as the *falleni* group, the *alternata* group, etc. However, since the *falleni* group is the subgenus *Subsigara,* and the *alternata* group falls within the subgenus *Vermicorixa,* and most of our South American species belong to the subgenus *Tropocorixa,* it has seemed necessary for the sake of consistency either to ignore the subgeneric names already proposed or to give subgeneric names to the remaining groups and to species that stand quite alone. The latter plan has been followed in this paper.

IDENTIFICATION OF CORIXIDAE

A. *Technique*

Most of the characters that are of taxonomic value have been mentioned in the history of the taxonomy of this family. The males possess adequate structural specific characters but the females, except in a few genera, do not. The females can, however, usually be placed by their resemblance to the males in color, pattern, sculpturing or structural details. In a mixed lot from a given locality it will save time to sort out and determine the males first and then associate the females with the males. The more experience one has with the Corixidae the easier this becomes. Until one becomes thoroughly familiar with the species, it is necessary to examine the male genital capsule and compare it with the drawing of the species you have determined it to be. This is not as difficult as one might think. The pinned specimen can be relaxed by a drop of relaxing fluid,* or five per cent alcohol and in a minute or two it is ready for examination. By holding the specimen with one hand under the binocular and using a small curve-pointed dissecting needle with the other hand, one can reach in between the lateral lobes of the eighth abdominal segment and gently withdraw the genital capsule entire without, in the slightest, disturbing the external appearance of the insect. The capsule does not have to be cleared and can be examined in alcohol or a drop of glycerin and remounted on a card beneath the insect or placed in a tiny vial with a little glycerin and pinned through its cork beneath the specimen. In routine determinations we usually simply relax the specimen and draw out the capsule far enough to examine the clasper without severing its connection. While the specimen is relaxed the abdomen can be bent down and the strigil and dorsal surface examined. In mounting Corixidae care should be taken not to pin through the metaxyphus. The precaution also should be taken in mounting small specimens on paper points not to cover the metaxyphus

The terminology used in this paper is intended to be non-technical with a sufficient number of drawings to identify structural parts. An excellent paper on corixid anatomy is Doctor Melvin E. Griffith's "The Environment, Life History and Structure of the Water Boatman, *Ramphocorixa acuminata* (Uhler)" in the University of Kansas Science Bulletin, Volume XXX, Part II, No. 14, pp. 241-365, 1945.

The instructions below should be followed in making the measurements used in the descriptions and keys:

1. The interocular space (or synthlipsis). To arrive at a conclusion as to whether or not the interocular space is narrower than, equal to, or broader than the width (posterior) of an eye, we have used a squared eye-piece micrometer. First, set the bug so that the head is as level as possible as seen from above. Do not move the specimen after it is in position. Next, measure each eye separately by means of the squares (see text figure below), and then compare these widths to the width of the interocular space. In the figure be-

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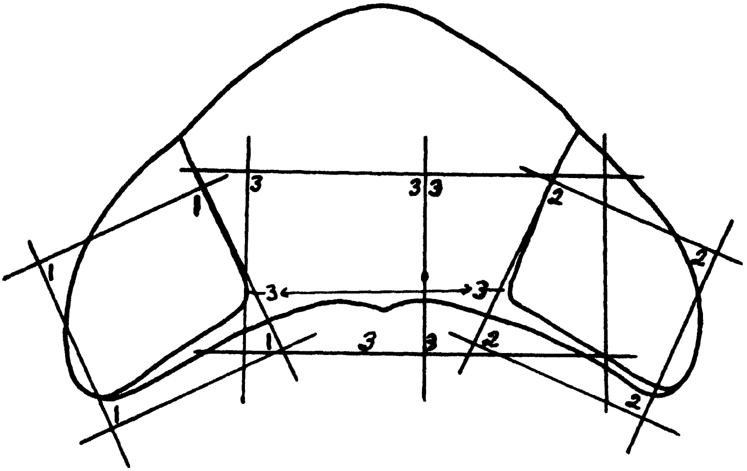
* Alcohol (75%), 106 cc.; Dist. water, 98 cc.; Benzol, 14 cc., Ethylacetate, 38 cc.

low the interocular space is broader than the eye since it measures one and one-half squares (No. 3), while the eyes (1 and 2) measure about one and one-fifth squares.



Measuring the Interocular Space

FIG. 2. (1) Measure the posterior width of left eye as seen from above. (2) Measure the posterior width of the right eye. (3) Measure the space between the eyes at the inner angles.

2. The pruinose areas. *a.* The claval pruinose area is measured from the basal shining angle of the clavus to the distal end of the pruinose area. *b.* Unless otherwise stated, the post-nodal pruinose area is measured by its greatest length, from its juncture with the cubital ridge to its apex.

3. The meron. At the base of the meron, where it (apparently) joins with the metaepisternum, there is a small groove or suture in the latter sclerite. The meron is measured from this groove to its distal end.

4. The metaxyphus is a triangular extension of the metasternum (see Plate III), and is measured from the point where the metasternum joins with the inner extension of the metaepisternum.

5. The legs. Measure the greatest possible length of each segment unless otherwise stated.

B. *Glossary of terms in this paper*

The following terms are defined or illustrations cited for the benefit of the casual student:

Acuminate—Tapering to a long point.

Allotype—A chosen type of the sex other than that of the holotype of a species.

Anal lobes—The lateral lobes of the eighth abdominal segment (see Plate III).

Appressed—Pressed, or flattened, against; closely applied to.

Carina—Ridge or raised area; also, a keel.

Caudad—Toward the rear.

Cephalad—Toward the head.

Constricted—With the sides approaching each other for a part of the distance.

Claspers of male Corixidae—Two unlike appendages attached to the genital capsule or ninth segment. In dextral males, the right one is free while the left one partially clasps the posterior sternal process and assists in guiding the phallic shaft. In sinistral males the opposite is true. Also called harpagones, parameres, gonopophyses, and styles.

Claval suture—Between the clavus and corium, along the vannal vein (see Plate III).

Clavus—The vannal portion of the hemelytron (see Plate III).

Corium—That portion of the hemelytron between the clavus and embolium, distally limited by the membrane (see Plate III).

Costal margin of a hemelytron—The outer margin of the forewing at rest.

Co-type—Any of the series mentioned in an original description in which the author did not designate a holotype.

Dextral—To the right of the median line; used for male Corixidae having the abdominal asymmetry, as viewed from above, on the right side, with the genital capsule directed toward the right, and with the strigil, when present, on the right side.

Embolar groove—The deep submarginal gutter on the embolium which may be extended beyond the nodal furrow. Its surface is pruinose.

Falcate—Sickle-shaped; convexly curved.

Fovea—see "frontal fovea "

Frons or front—That portion of the face or front of the insect head lying between the rostrum or beak and the vertex (see Plate III).

Frontal fovea—A depression on the frons of the male

Genital capsule of male—The ninth abdominal segment which, in Corixidae, is invaginated (see Plate III).

Genotype—The species selected as representative of a genus.

Haplotype—A type by single reference

Hemelytron—The front wing. (Plural, hemelytra)

Holotype—The specimen, usually male, set up by the author of a new species as the representative of that species

Hypo-ocular suture—Usually visible on the infraocular portion of the face of a corixid (see Plate III).

Infraocular portion of genae—That portion of the face of a corixid lying below the compound eye (see Plate III).

Infuscate (-ed)—Smoky gray-brown, with a blackish tinge.

Inosculate—Enmeshed, undulate lines.

Interocular space—The distance between the inner posterior angle of the eyes as seen from above. See also "Synthlipsis."

Keel—Ridge or raised area; also, a carina.

Laterad—Toward the side.

Lateral bend of mesoepimeron—(See Plate III).

Lateral flange of the sternellum—A sclerite extending laterad from the metasternum along the disto-lateral margin of the mesoepimeron and ending at the scent gland osteole. According to Snodgrass, it protects a groove through which the scent travels from the gland to the osteole and may even be a part of said groove.

Lateral lobe of prothorax—See "Prothoracic lateral lobe."

Lectotype—A holotype selected from the co-type series to represent the species.

Logotype—A type (of a genus) by subsequent designation.

Median—Center, middle.

Membrane—The distal, apical portion of the hemelytron (see Plate III).

Meron—A continuation of the metathoracic epimeron which in nymphs helps to shelter the spiracle of the first abdominal segment, and which in adults serves as a supporting pleurosternite of the first abdominal segment, articulating firmly with the tergal margin of the second. (After Griffith) (See Plate III.)

Mesoepimeron—The epimeron of the mesothorax (see Plate III)

Metacoxal piece—See "'Lateral flange of sternellum."

Metaepisternum—See "Metathoracic episternum."

Metasternal xyphus—The triangular plate lying between the hind coxae. It is a process of the metasternum

Metathoracic episternum or metaepisternum—The sternal plate of the metathorax (see Plate III).

Metaxyphus—See "Metasternal xyphus "

Neotype—A holotype by subsequent designation and not from the original type series

Nodal furrow—"A membranous joint in a softened (boiled) hemelytron of a corixid. In the Miridae, a similar joint is the boundary between the embolium and the cuneus If homologous in the two families, it (the nodal furrow) marks the distal end of the embolium in Corixidae " (Snodgrass *in litt.*) (See Plate III.)

Orifice of the scent gland—See "Osteole of the scent gland."

Orthotype—A type (of a genus) by original designation.

Osteole of the scent gland—Orifice of the scent gland, guarded by hairs, and located at the end of the lateral flange of the sternellum on the caudal (or caudo-lateral) margin of the mesoepimeron (see Plate III)

Pala—The tarsal segment of the front leg of Corixidae (see Plate III)

Palm—That portion of the pala, usually pilose, lying between the upper and lower row of palmar hairs (see Plate III).

Palmar hairs—Usually a row of long hairs on the lower margin of the pala, and a row of short hairs along the upper margin of the palm (see Plate III).

Paratype—A specimen or specimens described at the same time that the holotype is described.

Pebbled—A rough and irregularly indented surface.

Penial flaps—Two sclerotized flaps or plates at the distal end of the ectotheca or penial sheathe.

Penial sheathe—The ectotheca. This structure occurs on the male genital capsule and serves to protect and direct the aedeagus. It terminates distally in two sclerotized flaps (see Plate III).

Pilose—Covered with short hairs.

Postcoxal piece—See "Lateral flange of sternellum."

Postocular space—Dorsal surface of the head behind the eye.

Prestrigil—Stout setae, anterior to the strigil, on the posterior margin of the fifth tergal abdominal lobe of the male corixid (see Plate III).

Prestrigilar hairs or bristles—See "Prestrigil."

Pronotal disk—The pigmented or patterned portion of the pronotum (see Plate III).

Prothoracic lateral lobe—See Plate III.

Protuberance—Any elevation above the surface.

Pruinose—Having a frosted appearance

Pubescent—Covered with short hairs.

Rastrate—Covered with nearly parallel, longitudinal scratches.

Reticulate—Covered with a network of lines (see wash drawing of *Corixa*, Plate IV, fig 4).

Right clasper of male—See "Claspers of male Corixidae." (Also Plate III.)

Rugulose—Minutely wrinkled; roughened, but not rastrate

Scent gland osteole—See "Osteole of the scent gland."

Serrate—Saw-like.

Sieve hairs—See "Palmar hairs."

Sinistral—To the left of the median line; used for male Corixidae having the abdominal asymmetry, as viewed from above, on the left side, with the genital capsule directed toward the left, and the strigil, when present, on the left side

Sternellum—See meso- and metasternum.

Stramineous—Pale yellow, straw color.

Stridular area of femur—An area covered by rows of short pegs on the basal inner surface of the front femora of some males (see Plate III).

Strigil—A structure, usually made up of rows of comb-like teeth, on the sixth dorsal abdominal segment of the male corixid. Its function, according to Larsen, 1938, is to grip against the female venter in copulation.

Synthlipsis—The basal constriction of the vertex of the head; the nearest approach of the eyes to each other as seen from above. Also referred to as "the interocular space."

Tip of the ninth segment—Posterior sternal process of the ninth sternellum.

Undulate—Obtuse waves in segments of circles.

Vein Cu—Cubitus (see Plate III). Also Griffith's paper cited above.

Vein M—Media (see Plate III). Also Griffith's paper cited above

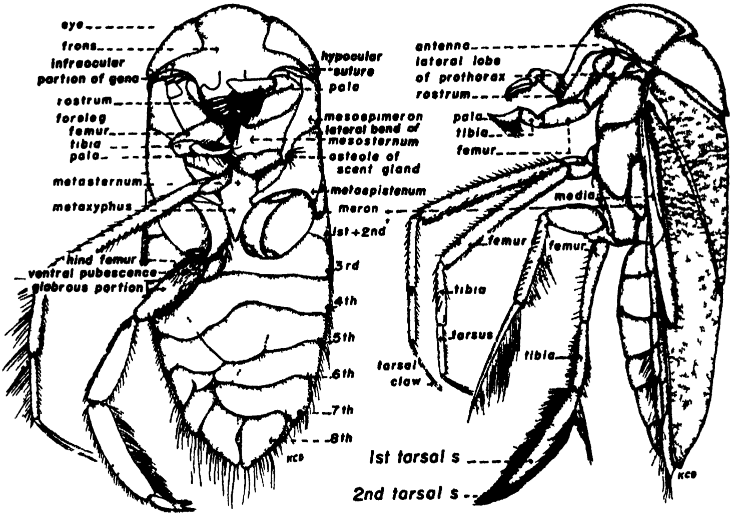
Vermiculate—With tortuous markings resembling the tracks of a worm

Vertex—The front margin of the head as seen from above.

CORIXIDAE

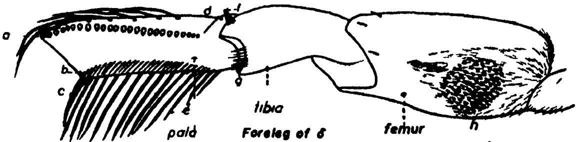
Family characteristics: Medium sized to small bugs somewhat flattened dorso-ventrally, the head broad, triangular in front view, concave posteriorly and overlapping the anterior margin of the prothorax. The rostrum or beak short, subconate, apparently unsegmented and firmly attached as part of the head. The absence of a recognizable segmented beak distinguishes the Corixidae from all other Hemiptera. Eyes large, triangular in outline. Ocelli absent

PLATE III



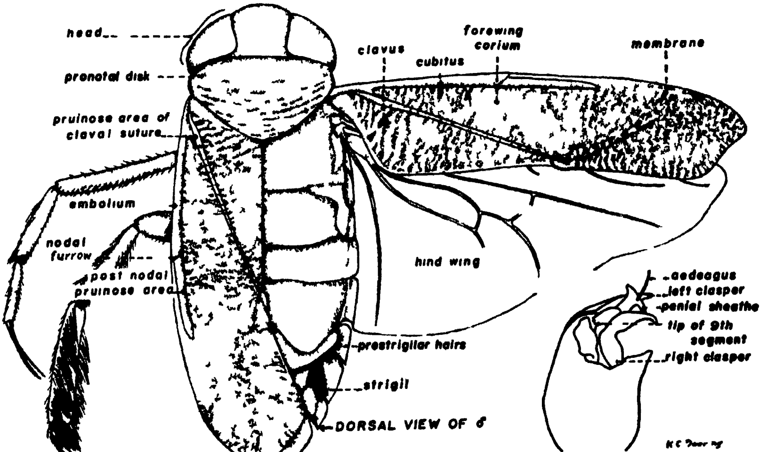
Ventral View of ♂

Lateral View of ♀



Foreleg of ♂

a peg row
b upper palmar bristles
c claw
d dorsal carina
e lower palmar bristles
f spiniform hair bundle
g pad
h. stridular area



DORSAL VIEW OF ♂

GENITAL CAPSULE

HESPEROCORIXA OBLIQUA (HUNGFD)

except in the Diaprepocorinae; antennae short, 3 or 4 segmented, inserted beneath the eyes and hidden between the head and prothorax. Scutellum may be exposed or hidden by the pronotum. The hemelytra parchment-like with clavus, corium, embolium, and membrane, the last without veins and of the same texture as the corium. Each pair of legs modified for a different function. Anterior legs short with the terminal segment (the pala) variable in form, but often more or less spoon-shaped and fringed with strong bristles for gathering food.* Middle legs for anchorage and support, elongate and slender, the single segmented tarsus† ending in two long claws. The posterior legs fairly stout with cardinate coxae, stout femora, short tibiae, and two-segmented tarsi that are flattened and fringed for swimming. The abdominal segments of the male more or less asymmetrical. The nymphs with dorsal abdominal scent glands, and adults with thoracic scent glands opening laterad of the mesocoxae.

KEY TO SUBFAMILIES OF CORIXIDAE

A. Scutellum exposed, covered by pronotum only at anterior margin

B. Two ocelli present, antennae 4-segmented, fore tarsal claw large
Diaprepocorinae Lundb. 1928
(Australasia)

BB. Ocelli absent; antennae 3-segmented; fore tarsal claw of ♀ spinelike, tarsal claw of male capable of being folded back into an excavation on the outside of the tarsus, of various shapes, usually large and often fleshy.
Micronectinae Jacz. 1924
(Tropical world) (See p. 54)

AA. Scutellum covered by pronotum (rarely with apex visible).

B. Hemelytra without embolar groove.. ....*Stenocorixinae* subf. n.
(African) (See p. 99)

BB. Hemelytra with embolar groove.

C. Rostrum with transverse sulcations absent, nodal furrow absent, vein M of hemelytron appearing to curve abruptly downward to costal margin
Cymatiinae subf. n.
(Holarctic) (See p. 99)

CC. Rostrum with transverse sulcations; nodal furrow complete, vein M usually curving upward to fuse with Cu at or just before the origin of the nodal furrow.

D. With the infraocular portion of genae very broad, the lower margin of eye concave, the hypo-ocular suture arising near the subacute production of the inferior angle of the eye; vein M indistinct, placed parallel and very near to vein Cu ..*Heterocorixinae* subf. n.
(South American) (See p. 105)

DD With the infraocular portion of the genae not broad, or if broad, the hypo-ocular suture when present arising about midway along ventral margin of eye; vein M present through most of the length, usually midway between costal margin and vein Cu and usually fused at apex with Cu.......... .. ..*Corixinae* Enderlein 1912
(World wide) (See p. 137)

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* In a few species the pala is fused with the tibia.

† In Diaprepocorinae middle tarsus is two-segmented.

WASH DRAWINGS OF THE GENERIC AND SUBGENERIC GROUPS OF THE CORIXIDAE OF THE WORLD

Drawn by Kathleen Doering and Addie Egbert

PLATE IV

FIG. 1. *Sigara* (*Tropocorixa*) *choprai* Hutchinson; male.
Subgenus *Tropocorixa* Hutchinson, 1940.
FIG. 2. *Stenocorixa protrusa* Horvath; female.
Genus *Stenocorixa* Horvath, 1926.
FIG. 3. *Ectemnostegella stridulata* n. sp.; male.
Genus *Ectemnostegella* Lundblad, 1928.
FIG. 4. *Corixa punctata* Illiger; female
Genus *Corixa* Geoffroy, 1762
FIG. 5. *Heliocorisa vermiculata* (Puton); male.
Genus *Heliocorisa* Lundblad, 1928.
FIG. 6. *Ectemnostega quadrata* (Signoret); female.
Genus *Ectemnostega* Enderlein, 1912
FIG. 7 *Corixanecta personata* (Hale); male.
Genus *Corixanecta* Walton, 1940.
FIG. 8. *Morphocorixa compacta* (Hungerford); male.
Genus *Morphocorixa* Jaczewski, 1931.*
FIG. 9. *Pseudocorixa guatemalensis* (Champion); male.
Genus *Pseudocorixa* Jaczewski, 1931.
FIG. 10. *Corisella decolor* (Uhler) (= *dispersa* (Uhler); male.
Genus *Corisella* Lundblad, 1928
FIG. 11. *Diaprepocoris barycephala* Kirkaldy; female.
Genus *Diaprepocoris* Kirkaldy, 1897.
FIG. 12. *Agraptocorixa eurynome* (Kirkaldy); female.
Genus *Agraptocorixa* Kirkaldy, 1898
FIG. 13. *Centrocorisa nigripennis* (Fabricius); male.
Genus *Centrocorisa* Lundblad, 1928.
FIG. 14. *Sigara* (*Pediosigara*) *hydatotrephes* (Kirkaldy); male.
Subgenus *Pediosigara* new.

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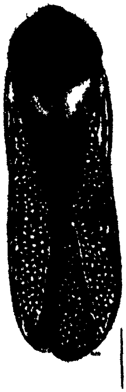
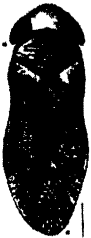
* Jaczewski placed *Morphocorixa* as a subgenus of *Sigara*, but we believe it to be a good genus.

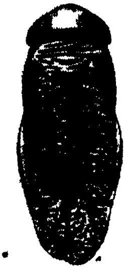
PLATE IV

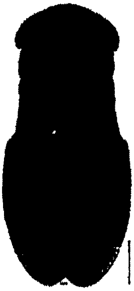
1 *Tropocorixa* Hutch

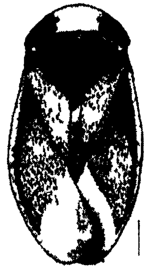

2 *Stenocorixa* Horv

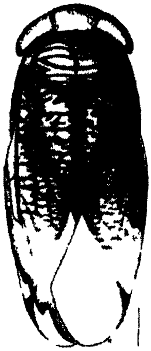

3 *Ectemnostegella* Lundbl

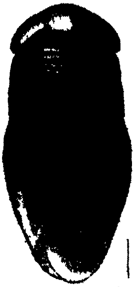
4 *Corixa* Geoffr

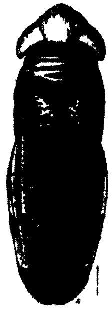

5 *Heliocorisa* Lundbl

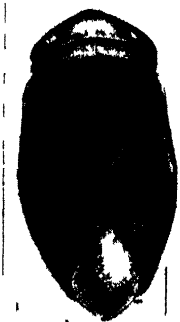

6 *Ectemnostega* Endl

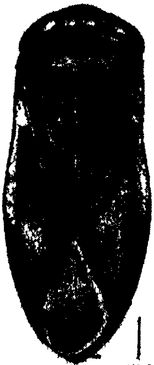

7 *Corixanecta* Walton

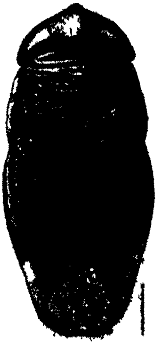

8 *Morphocorixa* Jacz


9 *Pseudocorixa* Jacz


10 *Corisella* Lundb


11 *Diaprepocoris* Kirk


12 *Agraptocorixa* Kirk.


13 *Centrocorisa* Lundbl

14 *Hydrotrephes* Kir

WASH DRAWINGS OF THE GENERIC AND SUBGENERIC GROUPS OF THE CORIXIDAE OF THE WORLD

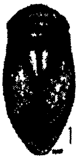
Drawn by Kathleen Doering and Addie Egbert

PLATE V

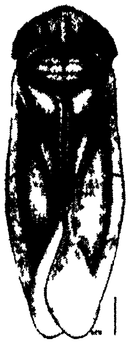
FIG. 15. *Micronecta minutissima* (Linné); female.
Genus *Micronecta* Kirkaldy, 1897.
FIG. 16. *Tenagobia socialis* (B. White); female.
Genus *Tenagobia* Bergroth, 1899.
FIG. 17. *Ramphocorixa acuminata* (Uhler) (= *balanodis* Abbott); female
Genus *Ramphocorixa* Abbott, 1912.
FIG. 18. *Ramphocorixa acuminata* (Uhler); male.
FIG. 19. *Trichocorixa verticalis* (Fieber); male.
Genus *Trichocorixa* Kirkaldy, 1908.
FIG. 20. *Heterocorixa* sp.; female.
Genus *Heterocorixa* B. White, 1879.
FIG. 21. *Cymatia americana* Hussey; female.
Genus *Cymatia* Flor, 1860.
FIG. 22. *Sigara* (*Vermicorixa*) *scabra* (Abbott); male.
Subgenus *Vermicorixa* Walton, 1940.
FIG. 23. *Trichocorixa verticalis* (Fieber); female. (Arrow indicates position of nodal furrow.)
FIG. 24. *Palmacorixa gillettei* Abbott; male (after Abbott).
Genus *Palmacorixa* Abbott, 1912.
FIG. 25. *Trichocorixella mexicana* (Hungerford) (= *wolski* Jaczewksi); male
Genus *Trichocorixella* Jaczewski, 1931.
FIG. 26. *Sigara* (*Lasiosigara*) *lineata* (Forster); male.
Subgenus *Lasiosigara* new.
FIG. 27. *Sigara* (*Lasiosigara*) *trilineata* (Provancher); male.

PLATE V

15 Micronecta Kirk



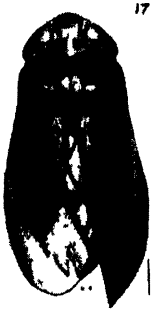
16 Tenagobia Berg



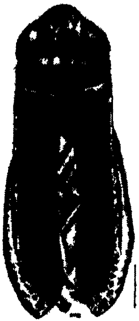
17 Ramphocorixa ♀ Abbt

18 Ramphocorixa ♂

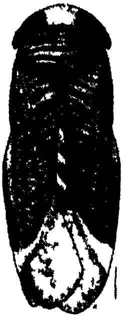
19 Trichocorixa Kirk. ♂



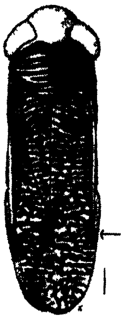
20 Heterocorixa White



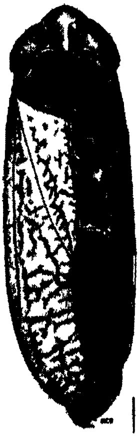
21 Cymatia Flor



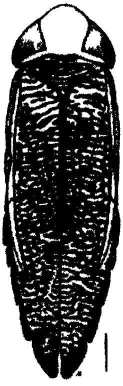
22 scabra Abbt



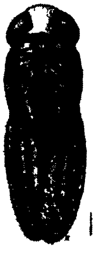
23 Trichocorixa ♀



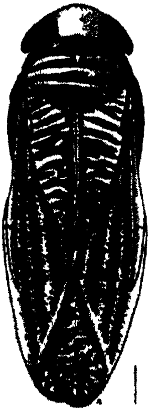
24 Palmacorixa Abbt



25 Trichocorixella Jacz.



26 lineata Forst



27 trilineata Prov

WASH DRAWINGS OF THE GENERIC AND SUBGENERIC GROUPS OF THE CORIXIDAE OF THE WORLD

Drawn by Kathleen Doering and Addie Egbert

PLATE VI

FIG. 28. *Callicorixa praeusta* (Fieber); male.
Genus *Callicorixa* B. White, 1873.

FIG. 29. *Krizousacorixa femorata* (Guérin); female
Genus *Krizousacorixa* Hungerford, 1930.

FIG. 30. *Krizousacorixa femorata* (Guérin); male.

FIG. 31. *Sigara (Phaeosigara) signata* (Fieber) (=*serrata* (Abbott); male.
Subgenus *Phaeosigara* new.

FIG 32. *Sigara (Pileosigara) douglasensis* (Hungerford); male.
Subgenus *Pileosigara* new (In this drawing the eyes should be parallel along the inner margins)

FIG. 33. *Neosigara griffini* (Kirkaldy) (= *williamsi* (Hungerford); male.
Genus *Neosigara* Lundblad, 1928.

FIG. 34. *Neosigara columbiensis* Lundblad; male.

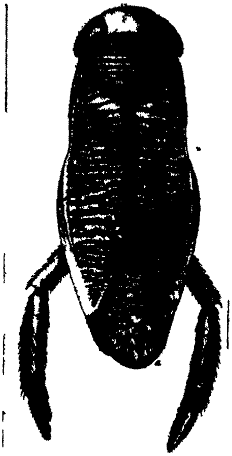
FIG. 35. *Glaenocorisa cavifrons* Thomson; female. [Now *G. propinqua* (Fieber).]
Glaenocorisa Thomson, 1869

FIG. 36. *Sigara (Phaeosigara) variabilis* (Hungerford); male.

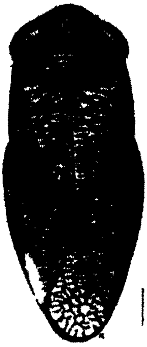
FIG. 37. *Neocorixa snowi* Hungerford; female.
Genus *Neocorixa* Hungerford, 1925.

FIG. 38 *Graptocorixa abdominalis* (Say); male.
Genus *Graptocorixa* Hungerford, 1930

PLATE VI



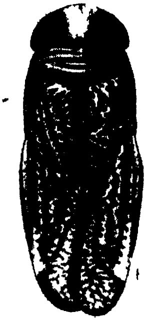
28 Callicorixa White



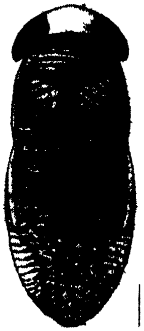
29 Krizousacorixa Hungfd ♀

30 Krizousacorixa ♂

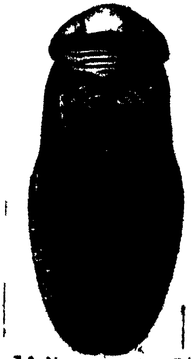
31 signata (Fieb) gr



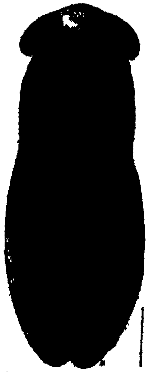
32 douglasensis Hungfd



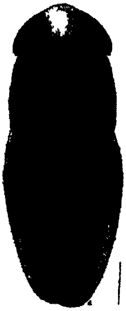
33. griffini Kirk



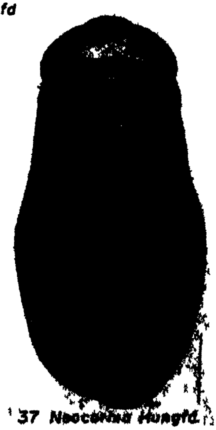
34 Neosigara Lundbl



35. Glaenocorisa Thoms



36. variabilis Hungfd



37 Neocorixa Hungfd.

38. Graptocorixa Hungfd.

WASH DRAWINGS OF THE GENERIC AND SUBGENERIC GROUPS OF THE CORIXIDAE OF THE WORLD

Drawn by Kathleen Doering and Addie Egbert

PLATE VII

FIG. 39. *Cenocorixa wileyæ* (Hungerford); male.
Genus *Cenocorixa* new.
FIG. 40. *Sigara (Aphelosigara) jarmanae* Hungerford; male.
Subgenus *Aphelosigara* new.
FIG. 41. *Sigara (Vermicorixa) omani* (Hungerford); male.
FIG. 42. *Sigara (Arctosigara) bicoloripennis* (Walley); male.
Subgenus *Arctosigara* new
FIG. 43. *Dasycorixa hybrida* (Hungerford); male.
Genus *Dasycorixa* new.
FIG. 44. *Sigara (Subsigara) falleni* (Fieber); male.
Subgenus *Subsigara* Stichel, 1935.
FIG. 45. *Hesperocorixa sahlbergi* (Fieber); male.
Genus *Hesperocorixa* Kirkaldy, 1908. (Including *Anticorixa* Jaczewski 1924.)
FIG. 46. *Hesperocorixa brimleyi* (Kirkaldy)*; female.
FIG. 47. *Sigara (Allosigara) decorata* (Abbott); male.
Subgenus *Allosigara* new.
FIG. 48. *Sigara (Xenosigara) ornata* (Abbott); male.
Subgenus *Xenosigara* new.
FIG. 49. *Sigara (Sigara) striata* (Linné); male.
Genus *Sigara* Fabricius, 1775.
FIG. 50. *Arctocorisa carinata* (Sahlberg); male.
Genus *Arctocorisa* Wallengren, 1894.

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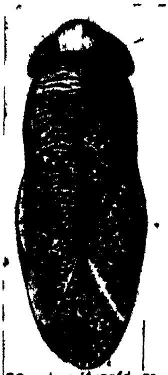
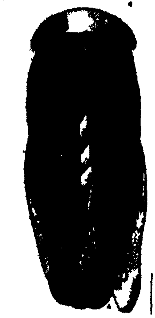
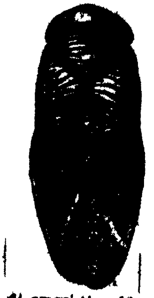
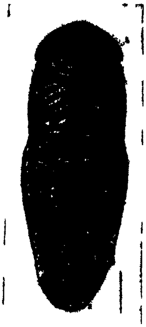
* Kirkaldy established *Hesperocorixa* as a subgenus with *brimleyi* as the subgenotype.

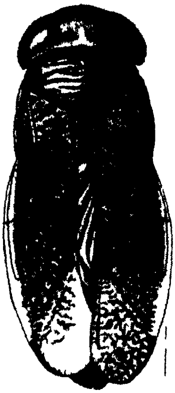
PLATE VII

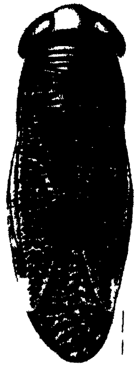

39 wileyi Hungfd gr

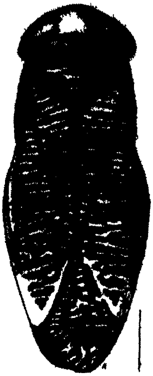

40 jarmanae Hungfd

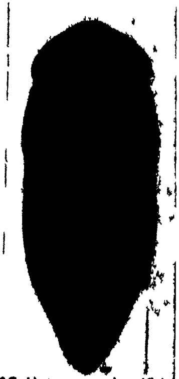

41 omani Hungfd gr

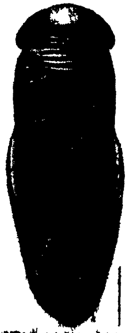

42 bicoloripennis Walley

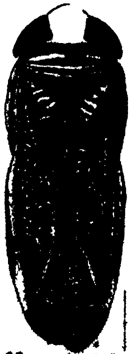

43 hybrida Hungfd gr

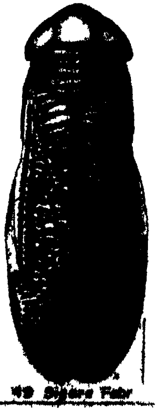

44 Subsigara Walton

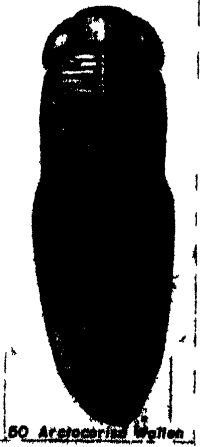

45 Anticorixa Jacz


46 Hesperocorixa Kirk.


47 decorata Abbt


48 ornata Abbt


49 Sigara Fabr


50 Arctocorisa Wallen

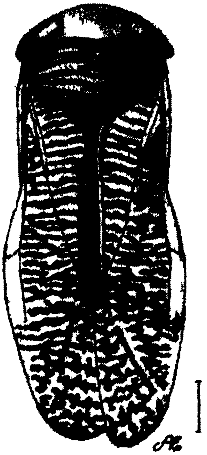
WASH DRAWINGS OF THE GENERIC AND SUBGENERIC GROUPS OF THE CORIXIDAE OF THE WORLD

Drawn by Addie Egbert

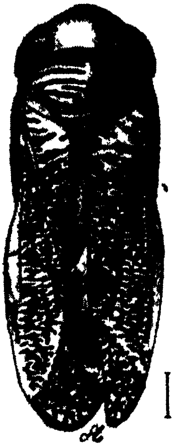
PLATE VIII

FIG. 51. *Sigara (Vermicorixa) nigrolineata* (Fieber); male.
Subgenus *Vermicorixa* Walton, 1940.
FIG. 52. *Sigara (Halicorixa) selecta* (Fieber); male.
Subgenus *Halicorixa* Walton, 1940.
FIG. 53. *Xenocorixa vittipennis* (Horvath); male.
Genus *Xenocorixa* Hungerford, 1947.
FIG. 54. *Pseudoglaenocorisa hugoscotti* (Hutchinson); male.
Genus *Pseudoglaenocorisa* Jaczewski, 1939.

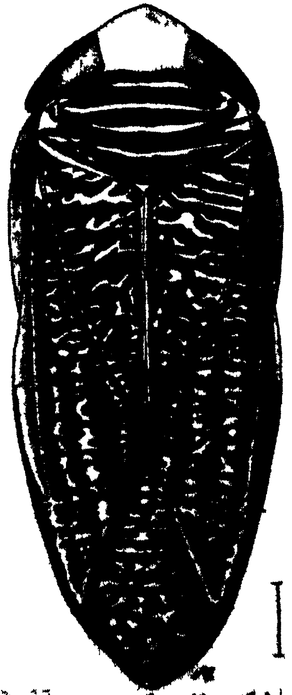
PLATE VIII



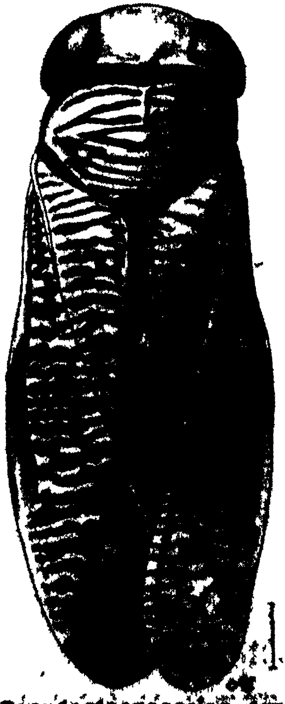
51. *Vermicorixa* Walton



52. *Halicorixa* Walton



53. *Xenocorixa* Hungfd.



54. *Pseudoglaenocorisa* Jacz.

MICRONECTINAE Jaczewski

Small corixids with exposed scutellum. The rostrum with transverse sulcations. Ocelli absent. Hypo-ocular suture in a lateral position. Antennae three-segmented. Pala with well developed palm. Hemelytra with shallow embolar groove. Nodal furrow may be well developed or absent.

This subfamily is represented in the Americas by the genus *Tenagobia* Bergroth.

The Genus *Tenagobia* Bergroth

1899. Bergroth, E. Ent. Mo. Mag., ser. 2, X (35), p 282.
1901. Champion, G. C. Biol. Centr. Amer. Heteroptera II, p. 383.
1906. Kirkaldy, G. W. Trans. Amer. Ent. Soc. XXXII, p. 152.
1909. Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Catalogue in Proc Ent. Soc. Wash. X, p. 193.
1917. Van Duzee, E. P. Catalogue of the Hemiptera . . . . p. 477.
1928. Lundblad, O. Arkiv. f. Zool. XX, A (7), pp 1-28.
1928. Jaczewski, T. Annales Mus. Zool. Polonici, VII, pp. 51-52, Pl. II.
1930. Deay, Howard. Bull. Brooklyn Ent Soc, XXV, No 3, p. 171.
1935. Deay, Howard Univ. of Kan. Sci. Bull. XXII, No. 14, pp. 403-477.
1935 Poisson, R. Archiv. de Zool. Exp. et Gén, LXXVII, p. 456.
1943 Walton, G. A. Trans. Soc. Brit. Ent. VIII, p. 157.

Since Howard O. Deay (1935) published a revision of this genus in the University of Kansas Science Bulletin XXII, No. 14, pp. 403-477, students interested in *Tenagobia* should refer to Doctor Deay's paper. For the sake of completeness and the convenience of the general student the key, descriptions and plates are reproduced from his work:

"Corixids with three-segmented antennae; ocelli absent; pronotum convex in front and concavely arcuate behind, covering but anterior part of scutellum which is large; so-called tympanal organ in metathorax present; strigil absent; abdomen in males with right-sided asymmetry; fore tibia and tarsus in females fused into a tibiatarsus; fore tarsus in males one-segmented, without stridulatory pegs, and excavated on outer surface to receive the large, fleshy, movable tarsal claw; a single, apical hind tarsal claw.

"This genus is very close to Micronecta Kirkaldy from which it is distinguished by the crescent-shaped pronotum and absence of a strigil in the males."

To Doctor Deay's description we may add that they do not have a nodal furrow in the hemelytron. This New World genus of very small corixids is confined to the Neotropical and southern extremity of the Nearctic regions. It extends from southern California to Buenos Aires, Argentina. One species only (*T. mexicana* Deay) occurs in North America, and we have seen no examples north of Mexico. Two species are recorded from Central America (*T. mexicana* Deay and *T. costaricana* Jaczewski); the other fourteen species are South American. We know nothing about the egg-laying or feeding habits of the *Tenagobia.*

The reader will please be mindful that all that follows concerning *Tenagobia* Bergroth is Doctor Howard O. Deay's work and is in his own words.

GROUPS WITHIN THE GENUS

On the basis of their structural characteristics the genus can be divided into two major and five minor groups. The presence or absence of a group of mustache-like bristles on the lateral margins of the epimera of the prothorax (Pl. X, figs. 15, 17) divides the species of the genus into two major groups.

Group I, those possessing mustache-like bristles, is composed of the following species: *constricta, fuscata, hungerfordi, melini, romani,* and *schadei.* The species within Group I form two distinct groups which the writer wishes to designate as the "*constricta* group" and the "*hungerfordi* group." The *constricta* group, composed of *constricta* and *romani,* is a very distinct one and possesses the following characters: an eye at least one-fourth times wider than the interocular space, long, slender forelegs which have but two spine-like setae on each femur, and claspers (Pl. XI, figs 4, 7) which are very different in shape from that of the other known species. The *hungerfordi* group, composed of *fuscata, hungerfordi, melini,* and *schadei,* is not as sharply defined as the *constricta* group, but the species composing it have the following characters in common: each fore femur bears five or more spine-like setae (*selecta* is the only other species having this many); the left clasper of each (Pl. XI, figs. 2, 3, 8, 13) has a brown, stiff projection on the inner side near the base; the right side of the sixth abdominal tergum has a deep cleft which bears a row of simple setae (also present in *selecta*); and the size and shape of the four species are similar. Of the species in this group, *schadei* is unique in that it is the only species of Tenagobia known which has no minute peg-like setae on the hemelytra. In all other characters, however, this species is much like *hungerfordi* and *melini.* *T. fuscata* does not seem to be closely related to the other species of this group. The claspers, aside from the projection on the right one, are much different and the wings are either absent or reduced to mere vestiges, an evidence of specialization.

Group II, consisting of those species which do not have mustache-like bristles on the lateral margins of the prothorax (Pl. X, fig. 17), includes the following species: *costaricana, incerta, mexicana, marmorata* (in all probability), *pulchra, selecta, serrata, signata, socialis* and *truncata.* These species fall into three clearly delimited groups which the writer designates as the "*truncata* group," the "*signata* group," and the "*selecta* group" although this last group contains but the one species. *T. costaricana, marmorata, pulchra,* and *truncata* compose the *truncata* group, which is characterized by the fact that the posterior margin of the pronotum is truncate in front of the bases of the hemelytra. The members of this group are the smallest of the known species of Tenagobia and are very similar to each other. The *signata* group, composed of *incerta, mexicana, serrata, signata,* and *socialis,* is characterized by the large spur-like seta on the lower margin of the fore femur. The species of this group are very similar in appearance and can be definitely distinguished from each other only by the claspers. In fact, Lundblad considers this group to be but a single species, *signata,* and its varieties. The remaining species, *selecta,* of Group II is very distinct from any of the other species of the genus. It is not only the largest of the species, but the tergite lobe of the eighth abdominal segment (Pl. IX, fig. 12) has become developed into a peculiarly shaped finger-like process. Its claspers are also different from those of any other species of the genus, the left (Pl. XI, fig. 14), however, is somewhat like that of *fuscata.* The number of spine-like setae on the fore femur and the cleft in the right side of the sixth abdominal tergum (Pl. IX, fig. 12) which bears a row of simple setae are the same characters which are found in the *hungerfordi* group of Group I. Whether these last characters are more indicative of relationship than the mustache-like bristles on the lateral margins of the epimera of the prothorax, the writer is unable to say.

SUMMARY OF GROUPS WITHIN THE GENUS

GROUP I Characterized by the presence of mustache-like bristles on the epimera of the prothorax.

1. The *constricta* group.... ...	*T constricta* *T. romani*
2. The *hungerfordi* group......	*T. fuscata* *T. hungerfordi* *T. melini* *T. schadei*

GROUP. II. Characterized by the absence of mustache-like bristles on the epimera of the prothorax.

1. The *truncata* group.........	*T. costaricana* *T. marmorata* *T. pulchra* *T. truncata*
2. The *signata* group.........	*T. incerta* *T mexicana* *T serrata* *T. signata* *T. socialis*
3. The *selecta* group...........	*T selecta*

DISTRIBUTION

The insects belonging to the genus Tenagobia are confined to the Neotropical and southern extremity of the Nearctic Regions. The known range of the genus is shown in Plate XIV. The numbers on this plate mark the places where material has been collected except "1" which represents Uhler's California record and "17" which represents the type locality of *T. marmorata*, the actual locality in Venezuela where this species was taken not being known. Although many more data are needed to determine the range of most of the species, the extreme limits of the range of the genus are rather definitely known. This statement is based on evidence which is difficult to show graphically. The map (Pl. XIV) shows the localities in which members of the genus have been taken, but gives no indication of the many other localities in which collections have been made without securing specimens of the genus. For example, Dr. R. H. Beamer of the University of Kansas has made intensive and extensive collections of the hemipterous fauna along the boundary of the United States and Mexico, but has not taken a single specimen of Tenagobia. This is very good evidence that no members of the genus occur in the southern United States at present.

One of the most striking features of the distribution of the genus is that it extends almost equal distance north and south of the equator. The extreme limits of north and south distribution are California (33° ? N. lat.) and Buenos Aires (35° S. lat.). The northern record is that of Uhler and he does not state in what part of California the specimens which he saw were taken. The most northerly locality from which the writer has seen specimens is Nainari, Sonora, Mexico (28° N. lat.).

The members of the genus seem to be confined principally to regions of low altitudes. Most of the specimens have been taken in localities below an altitude of 250 feet. Indeed, specimens have been collected at but six places which have an altitude of over 1,000 feet.

These are Cuernavaca, Morelos, Mexico, 5,418 feet altitude, where one specimen was taken at light; Puerto Bermudez, Rio Pichis, Peru, between 1,000 and 2,000 feet altitude; Rio Mapiri, Bolivia, 1,400 feet altitude; Santa Cruz, Bolivia, 1,350 feet altitude; and Piropara and Lassance, Minas Geraes, Brazil, about 1,000 feet altitude.

The range of the genus, except for California on the north, Buenos Aires and Montevideo on the south, and the few localities above 1,000 feet altitude, lies within the *tierra caliente* thermal region, that is, the region having a mean annual temperature above 72.5° F. The highest mean annual temperature of any place in the genus range is 82.2° F. (Manãos, Brazil) and the lowest 60.7° F. (Montevideo, Uruguay). The maximum temperature ever recorded within the range is 109° F. (Montevideo) and the minimum 25° F. (Montevideo). This dependence upon high temperatures explains the restriction of the genus to the costal streams of Mexico and also why it does not occur south or west of Buenos Aires. It seems to the writer that members of the genus can undoubtedly be found in fresh water anywhere in their range where the minimum temperatures are very little below freezing.

KEY TO THE SPECIES OF TENAGOBIA (MALES)

1. Hemelytra without minute peg-like setae, claspers as in figures 1 and 3, Plate XI .... *T. schadei* Lundblad, p. 67
Hemelytra beset with minute peg-like setae, sometimes not visible under low power 2

2 (1). Pronotum truncate in front of bases of hemelytra; not narrowed at the ends (Plate X, fig. 1) 3
Pronotum not truncate in front of bases of hemelytra, narrowed at ends (Plate X, fig. 4) 6

3 (2). Scutellum but little longer than pronotum; has been taken in Venezuela only. *T. marmorata* Bergroth, p. 70
Scutellum twice as long, or nearly twice as long as pronotum 4

4 (3). Fore tarsus as long as tibia (Plate XIII, fig. 11); 5th segment of abdomen with 1 spine-like seta on each lateral margin, 6th segment with 2 spine-like setae on each lateral margin, claspers as in figures 1 and 4, Plate XII; known only from Panama, Costa Rica and Honduras. *T. costaricana* Jaczewski, p. 68
Fore tarsus shorter than the tibia; 5th abdominal segment with 3 spine-like setae on each lateral margin, 6th with 3 or 4 spine-like setae on each lateral margin 5

5 (4). Sixth abdominal segment with 3 spine-like setae on either side; 5 long hair-like setae in upper row and 17 bristle-like setae in lower row on fore tarsus; claspers as in figures 2 and 5, Plate XII; known only from Bolivia. *T. pulchra* Hungerford, p. 71
Sixth abdominal segment with 4 spine-like setae on each lateral margin; 4 long hair-like setae in upper row and 14 bristle-like setae in lower row on fore tarsus; left clasper as in figure 8, Plate XII; known only from Ecuador .... *T. truncata* Deay, p 72

6 (2). Fore femur with a papilla-like projection on lower side from which arises a stiff spur (Plate XIII, figs. 2 and 8), a row of 4 spine-like setae on inner side 7

Fore femur without a papilla-like projection or spur on lower side, the row of spine-like setae on inner side either more or less than 4 in number. ... 11

7 (6). Heel of left clasper acute and well developed (Plate XII, fig. 6); right clasper as in figure 13, Plate XII.............. ....*T. mexicana* Deay, p. 79

Heel of left clasper rounded, not produced (Plate XII, figs. 7, 8, 9 and 10); right clasper not as above (Plate XII, figs. 11, 12, 14 and 15).......... 8

8 (7). Right clasper with a double row of serratures ventrally, heel very acutely angled (Plate XII, fig. 15); the left as in figure 7, Plate XII.
T. serrata Deay, p. 81

Right clasper without a double row of serratures ventrally (Plate XII; figs. 11, 12 and 14) 9

9 (8). Toe of left clasper suddenly produced into a definitely rounded point (Plate XII, fig. 9); heel of the right acute, toe much rounded (Plate XII, fig. 14) ....*T. socialis* (White), p. 82

Toe of left clapser not suddenly produced into a rounded point (Plate XII, figs 8 and 10); right clasper (Plate XII, figs 11 and 12) not as in *socialis* 10

10 (9). Toe of right clasper bluntly rounded, not much produced, heel not projected, right angled (Plate XII, fig. 12); left clasper as in figure 8, Plate XII.
T signata (White), p. 74

Toe of right clasper much produced, heel produced, acutely angled (Plate XII, fig 11), left clasper as in figure 10, Plate XII. . .*T. incerta* Lundblad, p. 77

11 (6). Tergite lobe of 8th abdominal segment produced into a long finger-like process (Plate IX, fig. 12).... ....*T. selecta* (White), p. 83

Tergite lobe of 8th abdominal segment normal, not produced into a long finger-like process (Plate X, fig 11)........ 12

12 (11). An eye about 1¼ times wider than interocular space (Plate X, fig 4) 13

An eye narrower than interocular space (Plate X, fig. 3).... 15

13 (12). Three lateral and 1 terminal spine-like setae on each lateral margin of 8th abdominal segment; 7-9 spine-like setae on inner side of fore femur; claspers as in figures 8 and 9, Plate XI. . .. .*T. fuscata* (Stal), p. 62

One or 2 lateral and 1 terminal spine-like setae on each lateral margin of 8th abdominal segment; 2 spine-like setae on inner side of fore femur 14

14 (13). Twenty-two bristle-like setae in lower row on fore tarsus (Plate XIII, fig. 6); 2 spine-like setae on each lateral margin of 8th abdominal segment; claspers as in figures 4 and 5, Plate XI.. . . *T. romani* Lundblad, p. 61

Fourteen bristle-like setae in lower row on fore tarsus (Plate XIII, fig 8); 1 spine-like seta on each lateral margin of 8th abdominal segment; claspers as in figures 6 and 7, Plate XI .... *T constricta* Deäy, p. 59

15 (12). Eighteen bristle-like setae in lower row on fore tarsus (Plate XIII, fig 4); 1 spine-like seta on each lateral margin of 6th abdominal segment; claspers as in figures 12 and 13, Plate XI..... . ... *T. melini* Lundblad, p. 65

Twelve bristle-like setae in lower row of fore tarsus (Plate XIII, fig. 7); 2 spine-like setae on each lateral margin of 6th abdominal segment, claspers as in figures 2 and 10, Plate XI ....*T. hungerfordi* Deay, p. 64

DISCUSSION OF THE SPECIES[9]

Tenagobia constricta Deay

(Plate X, figs. 4, 6, 8; Plate XI, figs. 6, 7; Plate XIII, figs 8, 9)
1930. *Tenagobia constricta* Deay. Bull. Brook. Ent. Soc., XXV(3):176-177

Size. Length, male 2.80 mm.; female, 3.0 mm. Width of head, male 1.05 mm.; female, 1.2 mm.

Color. Uniformly fuscous brown above; front and vertex transparent yellowish-gray, posterior margin of vertex darker; lateral margins of hemelytra lighter, each with two fuscous maculations.

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[9] The species are arranged alphabetically under the various groups as outlined on page 57 except that *T. signata* is placed first in the *signata* group.

Ventral aspect of thorax yellowish, abdomen darker; legs uniformly yellowish, slightly darker at distal ends.

Structural Characteristics of Male. Head (Pl. X, fig. 4): Posterior margin of vertex sinuate, caudolateral angles not produced laterally; an eye about 1¼ times wider than interocular space; posterior margin of eyes distinctly separated from posterior margin of head. *Prothorax:* Mustache-like bristles on lateral margins; pronotum a little narrower than head, 6½ times wider than median length, 2 times wider than base of scutellum; posterior margin not truncate in front of bases of hemelytra, narrowed at ends. *Scutellum:* Lateral margins sinuate, approximately 1⅕ times wider than long. *Hemelytra:* Membranes well developed, membranal suture of right hemelytron very distinct; numerous very minute peg-like setae scattered irregularly over the hemelytra (these setae are so fine that they appear to be missing when examined under low magnification); many fine hair-like setae near caudal ends, especially on the right. Ratio of length of pronotum, scutellum and from apex of scutellum to apex of clavus is as 21:50:135. *Wings:* Well developed in both sexes. *Abdomen:* 6th and 7th segments each with 2 spine-like setae on either side, the 7th segment relatively long; 8th segment (Pl. X, fig. 6) with 1 lateral and 1 terminal spine-like seta on either side, tergite-lobe rather truncate at end, bearing 15 long, slender hair-like setae, projection on the mesocaudal angle of right side bearing a group of meso-caudally directed bristle-like setae. *Claspers:* The right (Pl. XI, fig. 7) has a membranous basal portion, the distal part shaped somewhat like a sled runner with a notch about midway of dorsal surface; the left (Pl. XI, fig. 6) with a membranous hairy cap set on the upturned distal end. *Genital capsule and penis* (Pl. X, fig. 8): As illustrated. *Legs:* Front (Pl. XIII, figs. 8, 9) long and slender, femur with 2 weak spine-like setae on inner side, tarsus but little longer than tibia, 13 bristle-like setae in lower row, 14 setae in inner row, and 5 long hair-like ones in upper row, tarsal claw long and slender. Ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg is as 62:18:25:15.

Holotype. Male, Tena, Ecuador, Feb. 28, 1923 (F. X. Williams) in the Francis Huntington Snow Entomological Collection.

Allotype. As above.

Paratypes. 1 male and 14 females as above.

Distribution (Pl. XIV). Only the type specimens have been taken.

Comparative Notes. This species and the next, *T. romani*, are very similar. They agree in size, shape and in the fact that each has 2 spine-like setae on each front femur. They differ in the shapes of the claspers, although the right ones are very similar, in the number of bristle-like setae on the lower edge of the fore tarsus, *T. romani* having about 22 and *constricta* only 13, in the fact that in *romani* there are 2 lateral spine-like setae on the 8th abdominal segment and in *constricta* only 1.

Tenagobia romani Lundblad

(Plate X, fig 10; Plate XI, figs. 4, 5; Plate XIV, fig 6)

1928. *Tenagobia romani* Lundblad Ark f. Zool. Bd. XXA(7) ·pp. 25-28

Writer's Description: [10]

Size. Length, male, about 2.8 mm.; width of head, male, 0.86 mm.

Color. Background of hemelytra brown mottled with distinct transparent spots; base of clavus with a transparent V-shaped figure; each lateral margin of hemelytra with a distinct brown spot near the center. Middle legs light yellow with a dark-brown ring near apex of femur; the base of the tibia and the base and distal ends of tarsus dark.

Structural Characteristics of Male. Head: An eye about 1¼ times wider than interocular space; posterior margin of eyes distinctly separated from the posterior margin of head; posterior margin of vertex with a minute median tubercle. *Prothorax:* Mustache-like bristles present on lateral margins; pronotum narrowed at ends, not truncate in front of bases of hemelytra. *Scutellum:* 0.49 mm. long. *Hemelytra:* Membranes well developed, membranal suture of right hemelytron very distinct; numerous very minute peg-like setae scattered irregularly over the hemelytra (these setae are so fine that they appear to be missing under low magnification); many fine hair-like setae on the caudal end of hemelytra, especially on the right. Ratio of lengths of scutellum and from apex of scutellum to apex of clavus is as 49:83. *Wings:* Well developed. *Abdomen:* 6th and 7th segments each with 2 spine-like setae on either side, the 7th relatively long; 8th segment (Pl. X, fig. 10) with 2 lateral and 1 terminal spine-like setae on either side, tergite lobe truncate and bears some fine hair-like-setae, a projection on the mesocaudal angle of right side which bears 10 mesocaudally directed bristle-like setae. *Claspers:* The right (Pl. XI, fig. 5) simple, distal end broadened, not upturned; the left (Pl. XI, fig. 4) with the distal end upturned and hairy. *Legs:* Foreleg (Pl. XIII, fig. 6) long and slender, femur with 2 weak spine-like setae in lower row, 18 setae in inner row, 5-6 hair-like ones in upper row, tarsal claw very slender. Ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg is as 62:18:25:15.

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[10] All data given here that are not contained in the original description were supplied the writer by Doctor Lundblad through personal correspondence

Types. Manãos, Brazil, several specimens, Oct. 29 and Nov. 2, 1924 (D. Melin), in collection of Dr. D. Melin, Zoölogical Museum, Upsala, Sweden.

The writer has not examined the types of this species nor has he seen any specimens of it. Doctor Hungerford, however, examined the types when at Stockholm in 1928 and compared examples of the writer's material with them.

Distribution (Pl. XIV). Only the type specimens have been taken.

Comparative Notes. See this same heading under *T. constricta.*

Tenagobia fuscata (Stål)

(Plate IX, fig 7; Plate X, fig. 11; Plate XI, figs. 8, 9; Plate XIII, fig. 5)

1859. *Sigara fuscata* Stal. Hemiptera. Kongl Svens Freg Eugenies resa omk. Jord. Zool., IV.

1879. *Sigara fuscata* Stal. White, F B. Trans. Ent. Soc. London, XVII:273. (Probably an erroneous determination.)

1899. *Tenagobia fuscata* (Stal). Bergroth, E. Ent. Mo. Mag., ser. 2, X(85):282.

1928. *Tenagobia fuscata* (Stal). Lundblad, O. Ark. f. Zool, XXA(7).4-9.

1930. *Tenagobia fuscata* (Stal). Jaczewski, T Mitt. Zool Staat u Zool Mus. Hamburg, XLIV:143.

Size. Length, male, 3.3-3.45 mm.; female, 3.4-3.75 mm. Width of head, male, 1.3-1.4 mm.; female, 1.4 mm.

Color. Rather uniformly fuscous, sometimes shining above; eyes black; front and vertex yellow, except posterior margin, which is black; base of scutellum and tips and lateral margins of hemelytra yellowish, the latter with two dark maculations; transparent V-shaped figure near the base of each clavus. Venter dull grayish fuscous, posterior margins of abdominal segments lighter; legs yellowish, becoming fuscous distally.

Structural Characteristics of Male. Head (Pl. IX, fig. 7): Median posterior margin of vertex elevated into a tubercle, caudolateral angles of vertex right-angled; an eye about 1¼ times wider than interocular space; a distinct space between the posterior margin of head and eyes. *Prothorax:* Mustache-like bristles present on lateral margins; pronotum narrow, about 8½ times wider than long, nearly twice as wide as base of scutellum, posterior margin not truncate in front of bases of hemelytra, narrowed at ends. *Scutel-*

lum: Broad at base, narrowed abruptly about half way to apex, which is very acutely angled. *Hemelytra:* Exceed abdomen about 0.2 mm.; membranes much reduced; short spine-like setae scattered irregularly over the corium and clavus, few in numbers as compared with other species; distally there are many long, extremely fine setae. Ratio of lengths of pronotum, scutellum and from apex of scutellum to apex of clavus is as 2:4:15. *Wings:* Absent in type specimens according to Lundblad (17), present but short and nonfunctional in specimens from Buenos Aires and Paraguay. This holds true for the females as well as the males. *Abdomen:* 5th, 6th and 7th segments each with 2 short, spine-like setae on either side; the right side of 6th tergite has a diagonal cleft in which there is a row of short setae much as in *T. selecta* (Pl. IX, fig. 12); 8th segment (Pl. X, fig. 11) with 3 lateral and 1 terminal spine-like setae on either side, the tergite-lobe as in illustration. *Claspers:* The right (Pl. XI, fig. 9) has a broad base, a narrowed central part which bears a dorsal hump and a narrowed, upturned distal part; the left (Pl. XI, fig. 8) has a strongly chitinized brown projection at the base, the central part is slender and cylindrical and the distal part is greatly expanded into a frail, leaf-like structure which is ornamented with numerous rows of scale-like structures. *Legs:* Front (Pl. XIII, fig. 5) femur with a row of 6-9 spine-like setae on inner side; tarsus as long as tibia with 16-18 bristle-like setae in the lower row, 14-15 setae in inner row, and 3 long hair-like setae in upper row; tarsal claw relatively long and slender. The ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg is as 85:29:34:23.

Cotypes. Montevideo, Uruguay, many specimens (Hj. Kinberg, collected while circumnavigating the globe in 1851-'53) in Riksmuseum, Stockholm 50.

Distribution (Pl. XIV). Paraguay, Argentina (Buenos Aires) and Uruguay.

Collection Data. Argentina: Buenos Aires, 1 male (M. S. Pennington); 1 female, July 26, 1893 (Michaelson); Hudson, Province Buenos Aires, 3 males, 7 females, no other data. Paraguay: Albovena Srojoguasi, 4 males, 9 females, December, 1926 (F. Schade); Villa Rica, 1 female July 16 and 1 female Dec. 5, 1923 (F. Schade). Uruguay: Montevideo, many specimens, 1851-'53 (H. Kinberg), cotypes; 1 female, Aug. 3, 1893 (Michaelson).

The writer has examined all of the known specimens of this species except the cotypes. These were examined by Doctor Hungerford, who compared part of the writer's material with them.

The specimens collected by the Traill Expedition in the Rio Maderia and referred to as *T. fuscata* by White are not in the Perth Museum and seem to be lost, so it is impossible for the writer to say whether they were correctly identified. However, it is extremely doubtful if *fuscata* occurs that far north.

Comparative Notes. This species seems to be more closely related to *T. hungerfordi*, *T. melini*, and *T. schadei* than to any of the other species. It can be distinguished from them readily by the shape of the claspers and the number of spine-like setae along the lateral margins of the abdominal segments.

Tenagobia hungerfordi Deay

(Plate X, figs. 2, 3, 13; Plate XI, figs 2, 10; Plate XIII, fig. 7)

1930. *Tenagobia hungerfordi* Deay. Bull. Brook. Ent. Soc., XXV(3).177-179.

Size. Length, male, 2.85 mm.; female, 3-3.15 mm. Width of head, male, 1.05 mm.; female, 1.2 mm.

Color. Brownish fuscous above; eyes dark; vertex and front grayish transparent; hemelytra with lateral margins lighter and four dark maculations on each; a transparent V-shaped figure at base of each clavus. Yellowish beneath, hind legs darker distally.

Structural Characteristics of Male. Head (Pl. X, fig. 3). Posterior margin of vertex without median tubercle, caudolateral angles obtuse; an eye slightly narrower than interocular space; posterior margin of eyes widely separated from the posterior margin of the head. *Prothorax:* Mustache-like bristles present on lateral margins (Pl. X, fig. 13); pronotum about 7 times wider than median length, 4 times wider than posterior margin of vertex, 2 times wider than base of scutellum, posterior margin not truncate in front of bases of hemelytra, narrowed at ends. *Scutellum:* 1½ times wider than long, apex very acutely angled. *Hemelytra:* Membranes well developed, the left transparent; many minute peg-like setae scattered irregularly over the entire hemelytra, numerous fine hair-like setae distally; a deep longitudinal impression near each lateral margin in which there is a row of large setae. Ratio of the lengths of the pronotum, scutellum and from the apex of the scutellum to apex of clavus is as 20:50:120. *Wings:* Present and well developed in both sexes. *Abdomen:* 5th, 6th and 7th segments each with 2 spine-like setae on either side, ~~the~~ 5th and 6th tergites excavated on the right side and projected on the left; 8th segment (Pl. X, fig. 2) with 1 lateral and

1 terminal spine-like seta on either side; the tergite lobe bears 11 weak hair-like setae, its inner margin sinuate, right half of segment with a slight projection on mesal margin near the caudal end, which bears a tuft of short bristle-like setae. *Claspers:* The left (Pl. XI, fig. 2) with a brown pointed projection near the base, the end upturned and hollow; the right (Pl. XI, fig. 10) has the distal end bent up at nearly right angles to the basal part; ventrally there is a papilla-like projection. This clasper is very similar to the corresponding one in *T. schadei.* *Legs:* Front (Pl. XIII, fig. 7) with a row of 6 spine-like setae on inner side of femur; tarsus large, longer than tibia, 12 bristle-like setae in lower row, 13 small setae in inner row and 6 long hair-like ones in upper row. Ratio of lengths of femur, tibia, tarsus and tarsal claws of the middle leg is as 155:55:60:45.

Holotype. Male, Corumba, Matto Grosso, Brazil, Dec. 14-22, 1919 (R. G. Harris), in the Cornell University Museum.

Allotype and Paratypes. Nine specimens, all females, as above.

Distribution (Pl. XIV). Bolivia, Brazil (Matto Grosso) and Paraguay.

Collection Data. Bolivia: Province del Sara, 1 female, No. 30, 1912, and 1 female, Dec., 1913 (J. Steinbach). Brazil: Corumba, Matto Grosso, 1 male, 9 females, types, Dec. 14-22, 1919 (R. G. Harris). Paraguay: Villa Rica, 1 male, Jan. 7, 1923, and 1 female, Dec. 15, 1923 (F. Schade).

Comparative Notes. See this same heading under *T. melini.*

Tenagobia melini Lundblad

(Plate X, fig. 16; Plate XI, figs. 12, 13; XIII, fig. 4)

1928 *Tenagobia melini* Lundblad. Ark. f Zool. Bd XXA(7)·18-23

Writer's Description: [11]

Size. Length, male, about 3.0 mm.; width of head, male, 1.36 mm.

Color. General color dark; hemelytra mottled with transparent spots, base of clavus with clear V-shaped figure, lateral margins each with 4 deep-brown spots, left membrane transparent. Legs uniformly dark.

Structural Characteristics of Male. Head: An eye about four-fifths as wide as interocular space; posterior margins of eyes distinctly separated from the posterior margin of head. *Prothorax:*

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[11] This is a translation and rearrangement of the original description together with some additional information which was furnished the writer by Doctor Lundblad through personal correspondence.

Mustache-like bristles present on lateral margins. *Scutellum:* Very acutely angled at apex. *Hemelytra:* Numerous (several hundred) minute peg-like setae on corium and clavus, many fine hair-like setae near the distal end of hemelytra; membranal sutures not distinct; both membranes well developed. Ratio of lengths of scutellum and from apex of scutellum to apex of clavus is as 80:114. *Wings:* Present and well developed. *Abdomen:* 5th segment with 2 spine-like setae on either side; 6th segment with 1 spine-like seta on either side; posterior margins of 5th and 6th tergites projected on left side and excavated on right; 7th segment with two spine-like setae on either side; 8th segment (Pl. X, fig. 16) with 1 terminal and 1 lateral spine-like seta on either side; the tergite lobe bears many fine hairs, the right side of segment with a projection on mesal margin near caudal end which bears a tuft of about 7 short bristle-like setae. *Claspers:* The left (Pl. XI, fig. 13) is furnished at base with a strongly chitinized brown projection, the distal part upturned and spoon-shaped; the right (Pl. XI, fig. 12) with the distal part bent up at nearly right angles to the basal part. *Legs:* Front (Pl. XIII, fig. 4) with 6 spine-like setae on inner side; tarsus long, rather slender, longer than tibia, 19 long, bristle-like setae in upper row. Ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg is as 85:27:34:17.

Holotype. Male, Manãos, Brazil, Nov. 2, 1924 (D. Melin), in the collection of Dr. D. Melin, Zoölogical Museum, Upsala, Sweden.

Distribution (Pl. XIV): But one specimen, the holotype, has been taken.

Comparative Notes. This species and *T. schadei* and *hungerfordi* are close to each other in general appearance. *T. schadei* is unique among the species of Tenagobia in that it is the only one which has no minute peg-like setae on the hemelytra. It also differs from the other two species by the fact that it has but 5 spine-like setae on inner side of the fore femur instead of 6, and that the right side of the 8th abdominal segment is free from hairs for a short distance. *T. melini* differs from the other two in that it has but 1 spine-like seta on each lateral margin of 6th abdominal segment instead of 2, and that the tarsal claws of middle legs are shorter when compared to the tibia than in the others. *T. hungerfordi* differs from the other two in that it has but 12 bristle-like setae in lower row on fore tarsus while they have 18 or 19, and in that it has 6 long hair-like setae in upper row of fore tarsus and they each have 5. The claspers of all three species are distinct although the right claspers of *schadei* and *hungerfordi* are practically identical.

Tenagobia schadei Lundblad

(Plate X, fig. 14; Plate XI, figs 1, 3)

1928. *Tenagobia schadei* Lundblad. Ark. f. Zool. Bd. XXA(7):23-25.
1933. *Tenagobia schadei* Lundblad. Jaczewski, T. Ann Mus. Zool Polonici, X(1):3.

Writer's Description: [12]

Size. Length, male, 3.1 mm. Width of head, male, 1.33 mm.

Color. The same as that of *T. melini.*

Structural Characteristics of Male. Head: An eye about 4/5 as wide as interocular space, distinctly separated from the posterior margin of head. *Prothorax:* As in *T. melini. Hemelytra:* The minute peg-like setae absolutely missing, otherwise as in *T. melini. Wings:* Present, well developed. *Abdomen:* 6th segment with 2 spine-like setae on each lateral margin, the projection on the left side of the segment somewhat more produced and the whole segment longer than *T. melini;* 7th segment with 2 spine-like setae on each lateral margin; 8th segment (Pl. X, fig. 14) with 1 lateral and 1 terminal spine-like seta on each margin, numerous fine hair-like setae on tergite lobe, which is slightly different in shape than that of *T. melini;* in the middle of the right side of the segment is a space which is entirely free from hair-like setae. *Claspers:* The left (Pl. XI, fig. 3) with a strongly chitinized brown projection at base and the reticulately sculptured and striated distal end is upturned; the right (Pl. XI, fig. 1) with distal end upturned and with a papilla-like projection on under side. *Legs:* Foreleg with a row of 5 spine-like setae on the inner side of femur, otherwise as in *T. melini.* The ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg is as 82:29:34:19.

Holotype. Male, Villa Rica, Paraguay, May, 1925. (F. Schade) in Museum at Helsingfors, Finland.

Paratype. 1 specimen as above.

Distribution (Pl. XIV): Brazil (Pernambuco) and Paraguay.

Collection Data. Brazil: Beberibe, Pernambuco, 1 female, stream with very slowly running water, and 3 females, in pond, Nov. 30, 1931; 6 males and 6 females, in same pond, Dec. 1, 1931 (W. Roszkowski and St. Feliksiak). These data reported by Jaczewski. Paraguay: Villa Rica, 2 males, types, May, 1925 (F. Schade).

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[12] This is a translation and rearrangement of the original description, together with some additional information which Doctor Lundblad has furnished the writer through personal correspondence.

The writer has seen none of the above specimens. The type, however, was examined by Dr. H. B. Hungerford.

Comparative Notes. This species is unique in being the only species of Tenagobia which does not have minute peg-like setae on the hemelytra. For further comparative notes see discussion under *T. melini.*

Tenagobia costaricana Jaczewski

(Plate IX, fig. 4; Plate X, fig. 2; Plate XII, figs. 1, 4; Plate XIII, fig. 11)

1930. *Tenagobia costaricana* Jaczewski. Mitt. Zool. Staat. u. Zool. Mus. Hamburg, XLIV:144. May.

1930. *Tenagobia minuta* Deay Bull. Brook. Ent. Soc. XXV(3):171-172. June. (Synonym.)

Size. Length, male, 1.8 mm.; female, 1.8-2.0 mm. Width of head, male, 0.75 mm.; female, 0.78 mm.

Color. Above brownish-yellow, marked with indistinct fuscous irrorations; eyes darker, sometimes crossed with light bands; front transparent yellowish-gray with dark irrorations; scutellum sometimes with indistinct, broken, longitudinal reddish stripes; costal margins of hemelytra each bearing 3 fuscous maculations. Underside of thorax and legs uniformly yellowish-gray; abdomen darker, sometimes fuscous.

Structural Characteristics of Male. Head (Pl. IX, fig. 4): Posterior margin of vertex with median tubercle, caudolateral angles but little produced laterally; an eye about ¾ as wide as interocular space; posterior margin of eyes approximate the posterior margin of head. *Prothorax:* No mustache-like bristles on lateral margins; pronotum 5 times wider than its median length, 2½ times wider than posterior margin of vertex, 2 times wider than base of scutellum, anterior margin angulate, posterior margin truncate in front of bases of hemelytra and concavely arcuate in front of scutellum. *Scutellum:* Relatively large, approximately twice as long as median length of pronotum, apex very acutely angled. *Hemelytra:* Membranes well-developed, membranal suture in right rather well developed; many minute, peg-like setae scattered irregularly over the clavus and corium, more on posterior half of right corium than on the left; a distinct longitudinal impression along the costal margin of each corium. Ratio of length of pronotum, scutellum, and from apex of scutellum to apex of clavus is as 21:40:70. *Wings:* Well developed in both sexes. *Abdomen:* 5th segment with 1 spine-like seta on either side; 6th segment with 2 spine-like setae on either side; 7th segment with 4 spine-like setae on either side, a circular patch of minute setae in dextro-cephalic angle of the tergum; 8th segment (Pl. X, fig. 2) with 3 lateral and 1 terminal spine-like setae on either side, the tergite lobe with 12 hair-like setae, the right half of segment with a humplike projection on mesal margin near caudal end which bears a tuft of short bristle-like setae. *Claspers:* The left (Pl. XII, fig. 1) with a membranous, club-like distal end beset with scale-like structures, the basal and connective parts much the stronger; the right (Pl. XII, fig. 4) of the same texture throughout, apex pointed, the dorsal margin flattened in front of the apex and then curves down to join the base, 5 minute setae on right side. *Legs:* Front (Pl. XIII, fig. 11) with 2 spine-like setae on inner side of setae, tarsus large, as long as tibia, 13 bristle-like setae on lower edge, setae of inner row, except terminal ones, very minute, 5 long hair-like setae in upper rom; tarsal claw large, disk-shaped, constricted into a neck at base. The ratio of the lengths of femur, tibia, tarsus and tarsal claws of the middle leg is as 32:12:15:11.

Holotype. Male, Farm Hamburg am Reventazon, Costa Rica, "Einig. Nr. 52," 1927, in the Zoologische Staatsinstitut und Zoologische Museum, Hamburg.

Allotype (Designated in this paper): Female, Boqueron river, Panama, May, 1907 (A. Busck), in the U. S. National Museum.

Paratypes. None.

Distribution (Pl. XIV): Costa Rica, Honduras and Panama.

Collection Data. Costa Rica: Farm Hamburg am Reventazon, 1 male, holotype, 1927, no other data. Honduras: Near Tela, 8 males, July 16, 1933 (F. H. Test). These specimens were taken in a small pool in sand near a small creek which empties into the Tela river two and one-half miles from the town of Tela. Altitude 80 to 90 feet. There were many individuals in the pool. Panama: Boqueron river, 4 males, 3 females, May, 1907 (A. Busck). The Boqueron river is an inland stream east of the Canal Zone. It flows into the Pequeni river, which in turn empties into the Rio Chagres.

As Jaczewski described the species from but a single specimen, the writer designates one of the females taken in Panama as *allotype.*

Dr. E. Wagner of the Zoologische Staatsinstitut und Zoologische

Museum of Hamburg has been kind enough to send the writer the holotype of this species for examination.

Comparative Notes. See this heading under *T. truncata.*

Tenagobia marmorata Bergroth

1899. *Tenagobia marmorata* Bergroth. Ent. Monthly Mag. ser. 2, X(85).282.
1928. *Tenagobia marmorata* Bergroth Lundblad, O. Ark f. Zool. Bd. XXA(7) 3.

Original Description:

"Oblong-ovalis, glabra, nitidula, albido-testacea, fronte notulis nonnullis rubris ornata, scutello maculis duabus parbis basalibus ferrugineis signato, pronoto et hemelytris glaucis, his fusco-marmoratis, area costali albido-testacea, macula media et apicali fusca notata, no venula obliqua basali, margine interno commissuraque clavi albidis, pedum posteriorum femoribus, tibiis articulisque tarasalibus apice nigrinis. Caput laeve, fronte paullo rotundato-prominente, vertice base oculo distincte latiore, prope orbitam interiorem oculorum lineoa longitudinali breve impressula praedito, margine basali medio in tuberculum minutum nigricans elevato Pronotum laeve, capite perpaullulum latius et distincte brevius, margine antico medio subangulato, margine postico ante basin hemelytrorum truncato, ante scutellum profunde sinuato. Scutellum nonnihil convexum, parte parva apicali deplanatum, base verticis paullo latius, pronoto perpaullo longius. Hemelytra apicem abdominis paullum superantia, fere impunctata, area costali latiuscula, profunde impressa, extus late rotundata, commissura clavi scutello fere domidio longiore. Long, 2 mm. Venezuela."

Original Description (translated by the writer):

"Oblong-oval, smooth, shining, whitish-testaceous, front ornamented with several red marks, scutellum marked with two small basal, iron-gray spots, pronotum and hemelytra glaucus, the latter dark mottled, the costal area whitish-testaceous, a median spot and apex marked with fuscous; oblique basilar veinlets, internal margin and the commissures of clavus whitish; posterior leg with the femur, tibia and tarsal segments black at apex. Head smooth, front somewhat roundly prominent, base of the vertex distinctly wider than an eye, furnished near the interior orbit of the eye with a short impressed longitudinal line, median basal margin elevated into a minute black tubercle. Pronotum smooth, very little wider and distinctly shorter than head, median anterior margin subangulate, posterior margin truncate in front of the base of the hemelytra, deeply sinuated in front of the base of the scutellum. Scutellum not convex, small apical part flattened, base little wider than vertex, very little longer than pronotum. Hemelytra a little longer than apex of the abdomen, closely punctated, costal area expanded, deeply impressed, broadly rounded outwardly, commissures of the clavus fully one half longer than the scutellum. Length, 2 mm."

Although this species is the halotype of the genus it is not known whether the holotype is a male or a female, as the type specimens cannot be found. Bergroth's description contains few references to structural characters, but it seems to the writer that there are enough characters given to distinguish this species from any of the others known. The structural characters of diagnostic value which Bergroth gives are "length, 2 mm.," "median anterior margin of pronotum subangulate, posterior margin truncate in front of bases of hemelytra, deeply sinuated in front of base of scutellum," "scutellum very little longer than pronotum," "claval commissure fully one half longer than scutellum."

Types. Unfortunately all of the type specimens seem to be lost at present. No distributional or habitat data, except that the specimens were taken in Venezuela, are given by Bergroth.

No other species of Tenagobia has been taken in Venezuela, although *T. incerta* has been taken in Trinidad.

Comparative Notes. T. marmorata belongs to the "*truncata* group" of Tenagobia. It may be distinguished from the other species of this group by the shortness of the scutellum, which is but "little longer" than the pronotum.

Tenagobia pulchra Hungerford

(Plate X, fig. 5; Plate XII, figs. 2, 5; Plate XIII, fig 12)

1927. *Tenagobia pulchra* Hungerford. Proc. Ent. Soc. Wash XXIX(8).189.

Size. Length, male, 2.1-2.2 mm.; female, 2.17-2.25 mm. Width of head, male, 0.8 mm.; female, 0.82 mm.

Color. General color grayish-yellow above and whitish below. Hemelytra with brownish irrorations, lateral margins paler, each with 2 brown maculations.

Structural Characteristics of Male. Head: Posterior margin of vertex with a median tubercle, caudolateral angles but little produced laterally; an eye about ¾ as wide as interocular space; posterior margin of eyes narrowly separated from the posterior margin of head. *Prothorax:* No mustache-like bristles present on lateral margins; pronotum a little over 4 times wider than its median length, 2½ times wider than posterior margin of vertex, 2 times wider than base of scutellum, anterior margin angulate, posterior margin truncate in front of bases of hemelytra, concavely arcuate in front of scutellum. *Scutellum:* As wide as long, apex very acutely angled. *Hemelytra:* Membranes well developed in both hemelytra; many minute peg-like setae scattered irregularly over corium and clavus, more on lateral halves. The ratio of the lengths of the pronotum, scutellum and from the apex of scutellum to the apex of clavus is as 6:11:21. *Wings:* Present, well developed in both sexes. *Abdomen:* 5th and 6th segments each with 3 spine-like setae on either side, 7th segment with 4 spine-like setae on either side, 8th segment (Pl.

X, fig. 5) with 3 lateral and 1 terminal spine-like setae on each side, the tergite lobe with 12-13 hair-like setae, right part of segment with a small hump midway on mesal margin, the segment as a whole relatively free from hairs. *Claspers:* The left (Pl. XII, fig. 2) with the distal part weak and broad but tapering at apex, beset with scale-like structures, the base and central parts much stronger; the right (Pl. XII, fig. 5) of the same texture throughout, constricted suddenly near distal end, 5 minute setae on the right side. *Legs:* Foreleg (Pl. XIII, fig. 12) with 2 spine-like setae on inner side of femur; tarsus shorter than tibia, 17 bristle-like setae in lower row, 14 setae in inner row and 5 long hair-like setae in upper row. The ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg is as 38:14:18:12.

Holotype. Male, mouth of Rio Mapiri, Rio Beni, Bolivia, September (W. M. Mann, Mulford Biol. Exp. 1921-'22) in U. S. National Museum.

Paratypes. One male and many females taken with the holotype, in the U. S. National Museum and the Francis Huntington Snow Entomological Collection.

Distribution (Pl. XIV): Only the type specimens have been taken.

Comparative Notes. See this heading under *T. truncata.*

Tenagobia truncata Deay

(Plate X, figs. 1, 15; Plate XII, fig. 3; Plate XIII, fig 1)

1930. *Tenagobia truncata* Deay. Bull. Brook. Ent. Soc., XXV(3).172-174

Size. Length, male, 2.17 mm.; female, 2.3 mm. Width of head, male, 0.8 mm.; female, 0.9 mm.

Color. Uniformly brownish to fuscous above; front lighter; no maculations on lateral margins of hemelytra, the proximal half dark, bases of hemelytra lighter; scutellum sometimes with lighter longitudinal lines. Venter fuscous; legs uniformly yellowish-gray.

Structural Characteristics of Male. Head (Pl. X, fig. 1): Posterior margin of vertex with minute median tubercle, caudolateral angles but little produced laterally; an eye about 4/5 as wide as interocular space; posterior margin of eyes narrowly separated from the posterior margin of head. *Prothorax:* No mustache-like bristles on lateral margins; pronotum 5 times wider than median length, maximum width a little greater than base of head, nearly 3 times wider than scutellum, anterior margin angulate, posterior margin truncate in front of bases of hemelytra and concavely arcuate in front of scutellum. *Scutellum:* Approximately twice as long as median length of pronotum, apex very acutely angled. *Hemelytra:* Membranes in both sexes well developed, membranal suture distinct in right hemelytron; many peg-like setae scattered irregularly over the corium and clavus, more numerous along the longitudinal impression along the lateral margin of each corium. The ratio of lengths of pronotum, scutellum and from apex of scutellum to apex of clavus is as 28:55:80. *Wings:* Well developed in both sexes. *Abdomen:* 5th segment with 3 short spine-like setae on either side; the 6th and 7th segments each with 4 spine-like setae on either side, the 7th with a patch of minute setae in dextrocephalic angle of tergum; 8th segment (Pl. X, fig. 15) with 3 lateral and 1 terminal spine-like setae, the tergite lobe with 10 hair-like setae, the right half of segment with a hump-like projection on mesal margin near caudal end, which bears a tuft of short bristle-like setae. The 8th segment is much smaller in this species than it is in either *costariciana* or *pulchra*. *Claspers:* The left (Pl. X, fig. 3) membranous distally and rather spoon-shaped (the drawing is of the lateral aspect), beset with minute scale-like structures on its right face, basal and connective parts stronger; the right resembles that of *costaricana* and *pulchra,* its apex roundingly pointed and sloping gradually from the apex to the base, 6 minute setae on right side. *Legs:* Front (Pl. XIII, fig. 1) slender, femur with two spines on inner side, tarsus noticeably shorter than tibia, 14 bristle-like setae in lower row, 11 weak setae in inner row, 4 long hair-like setae in upper row, tarsal claw large, disc-shaped. Ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg is as 32:10:15:9.

Holotype. Male, Tena near Oriente, Ecuador, March 29-April 10, 1923 (F. X. Williams), in the Francis Huntington Snow Entomological Collection.

Allotype. As above.

Paratypes. 1 male and 3 females as above.

Distribution (Pl. XIV): Only the type specimens have been taken.

Comparative Notes. This species and the preceding three, *costaricana, marmorata* and *pulchra* form the *truncata* group of Group I, being characterized by having the pronotum truncate in front of the base of the hemelytra. The localities in which the different species have been collected are distant from each other, and each, with the exception of *costaricana*, has been taken but once. Other species that belong to this group will undoubtedly be found when more intensive collections have been made; in fact, the writer has specimens of females of this group which are without doubt distinct from the known species.

Of the four species known, *marmorata* is unsatisfactorily described; but as pointed out under the discussion of that species, Bergroth states that the scutellum is very little longer than the pronotum ("pronoto perpaullo longius") and this distinguishes it from the other three species. The remaining three species are more distinct than the preceding descriptions possibly indicate. *T. truncata* is not as robust as the other two, its legs being much more slender and the abdominal segments, especially the eighth, much smaller. Aside from the claspers, *costaricana* is probably best distinguished from the other two by the fact that the fore tarsus is as long as the fore tibia; and *truncata* from *pulchra* by the shape of the eighth abdominal segment, particularly of the tergite lobe and by the fact that the sixth abdominal segment bears three spine-like setae on each lateral margin in *pulchra* and four in *truncata*.

Tenagobia signata White

(Plate X, fig. 7; Plate XII, figs. 8, 12)

1879. *Sigara signata* White. Trans. Ent. Soc. London, XVII:274.

1879. *Sigara socialis* var *sobrina* White. Trans. Ent. Soc. London, XVII:275. (Orig. descrip. of synonym.)

1879. *Sigara seducta* White Trans Ent. Soc. London, XVII:275. (Orig. descrip. synonym.)

1879. *Sigara simulans* White. Trans. Ent. Soc. London, XVII:276. (Orig. descrip. of synonym.)

1928. *Tenagobia signata* (White). Lundblad, O. Ark. f. Zool. Bd. XXA(7):13-16.

1930. *Tenagobia signata* (White). Jaczewski, T. Mitt. Zool. Staat. u. Zool. Mus. Hamburg, XLIV:143-144. (Mistaken identity.)

1931. *Tenagobia signata* (White). Jaczewski, T. Ann. Mus. Zool. Polonici, IX(15):233. (Mistaken identity.)

Size. Length, male, 2.4-2.8 mm.; female, 2.6-3.0 mm.; width of head, male, 0.95 mm.; female, 1.0 mm.

Color. Varies from grayish or yellowish to brownish fuscous above, sometimes uniformly colored, but commonly with alternate lighter and darker wavy longitudinal striations which give a marbled appearance to the hemelytra, rarely with broken and irregular orange-red lines on vertex, pronotum, scutellum and hemelytra, lateral margins of hemelytra each with four dark maculations, a transparent V-shaped figure near base of each clavus, a slender, transparent longitudinal line in right hemelytron caudal to claval suture, distal end of left hemelytron transparent. Venter and legs vary from grayish white to grayish fuscous.

Structural Characteristics of Male. Head: Posterior margin of vertex with a minute median tubercle, caudolateral angles produced laterally; an eye about six-sevenths times as wide as interocular space; distinct, though narrow, space between the posterior margin of eyes and posterior margin of head. *Prothorax:* No mustache-like bristles on lateral margins; pronotum about 5 times wider than median length, about 2½ times wider than posterior margin of vertex, about 1.6 times wider than base of scutellum, posterior margin not truncate in front of bases of hemelytra, narrowed at ends. *Scutellum:* About 2½ times wider at base than length, a little over twice as long as pronotum. *Hemelytra:* Exceeds abdomen slightly, membranal suture distinct in right hemelytron, but not in left; minute peg-like setae scattered irregularly over the outer half of the corium, those on lateral margins arranged in longitudinal rows, impressed line on outer half of corium forming an embolium. Ratio of lengths of pronotum, scutellum, and from apex of scutellum to apex of clavus is as 18:40:70. *Wings:* Present in both sexes. *Abdomen:* 5th, 6th and 7th segments each with 2 short spine-like setae on either side, 8th segment with one terminal and 3 lateral spine-like setae on either side, the tergite lobe (Pl. X, fig. 7) with a few weak hair-like setae, the right half of segment with a hump-like projection on the mesal margin near the caudal end from which arises a tuft of short bristles. *Claspers:* The right (Pl. XII, fig. 12) serrate ventrally, the heel right angled, toe slightly produced, broadly rounded at apex; the left (Pl. XII, fig. 8) rather simple, heel not developed, toe sharply pointed. *Legs:* Front, femur with a stiff spur which arises from a papilla-like projection on the lower side (Pl. XIII, figs. 2, 3); above this on the inner side is a row of 4 spine-like setae; tarsus shorter than tibia, 16-17 bristle-like setae in the lower row, 14-16 short setae in inner row, 10-11 long hair-like setae in upper row; tarsal claw short and broad except at distal end where it is suddenly constricted. The ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg is as 60:19:25:20. The tarsal claw of hind leg is 3-pronged, one being very short, and the one of medium length being over three-fourths as long as the longest.

Cotypes. Rio Purus, Brazil, 9 specimens, November, 1873 (J. W. H. Traill), in Perth Museum, Perth, Scotland, and British Museum (Natural History).

Synonyms. As pointed out in the general discussion on synonymy, *socialis* var. *sobrina* (White), *seducta* (White) and *simulans* (White) are all synonyms of *T. signata.* The writer also pointed out at that time that on account of their geographical distribution that he believes the specimens of *T. socialis* collected by Doctor Traill at Anana, Upper Amazon, November, 1874, and at Urubu Caxoeira, November, 1874, belong to *signata.*

Distribution (Pl. XIV). Brazil: Rio Jurua, Rio Purus, Tonantins, Upper Amazon.

Collection Data. Rio Purus, 9 specimens, November, 1873 (J. W. H. Traill), type locality; Rio Jurua, "many specimens at light" October and November, 1874 (J. W. H. Traill), *seducta;* Urucaca, Rio Jurua, "many specimens" (J. W. H. Traill), *socialis* var. *sobrina;* Upper Amazon, October 13, and Tonantins, December 12, 1874, 3 females (J. W. H. Traill), *simulans.*

The writer, through the kindness of Dr. W. E. China, has examined specimens of the cotypes and all of the synonyms.

Lundblad refers some female specimens collected by Ramon in the Rio Autaz, near Manãos to *signata,* but they are probably specimens of *incerta* or *socialis* The writer has examined many specimens of the *signata* group which have been collected on the Amazon from Manãos to its mouth, but no *T. signata* specimens have been among them. In fact, no specimens of this species have been taken since Traill's Expedition in 1873-'75, but on the other hand, no collections of Tenagobia have been made in the Upper Amazon, Jurua and Purus rivers since that time. The fact that *signata* has not appeared in the collections that have been made since the above expedition is a good indication that this species is restricted to that region.

The specimens in the Zoologische Staatsinstitut und Zoologische Museum of Hamburg which were referred to *signata* by Jaczewski belong to *socialis* and *mexicana.* That is, the specimens from Paramaribo, Dutch Guiana, are *socialis,* and those from Mexico are *mexicana.*

Comparative Notes. As stated previously in this paper under the heading "groups within the genus," *signata, socialis, incerta, mexicana* and *serrata* compose a group of very similar species which the writer (3) has designated as the *signata* group. The females of this group are practically indistinguishable from each other, but the males exhibit definite, constant characters which are specific. For this reason, and because of the distribution of these species, the writer believes them to be distinct species. Lundblad reduced *socialis* to a variety of *signata* and described *incerta* as a variety of it. The other two species of the group had not been described at that time. The species can be easily distinguished from each other by the shape of the male claspers. An idea of the differences in these claspers can be obtained more clearly by studying the illustrations in Plate XII than from a verbal description of them. Both claspers of *mexicana* (figs. 6, 13) are distinct; the left claspers of *signata* (fig. 8) and *serrata* (fig. 7) are very similar, and that of *incerta* (fig. 10) resembles them, but the right claspers of these three species (figs. 12, 15, 11) are very distinct; on the other hand, the right claspers of *socialis* (fig. 14) and *serrata* (fig. 15) are somewhat alike, but the left claspers of these two species (figs. 7, 9) are distinct.

Tenagobia incerta Lundblad

(Plate XII; figs. 10, 11)

1928. ***Tenagobia signata*** **var.** ***incerta*** **Lundblad Ark. f. Zool. Bd. XXA(7) 16-18.**

1894. ***Sigara socialis*** **White. Uhler, P. R. Proc. Zool. Soc London 224. (Mistaken identity.)**

1938. ***Tenagobia signata*** **var** ***incerta*** **Lundblad Jaczewski, T. Ann Mus Zool Polonici, X(1):2-3.**

Size. Length, male, 2.55-2.8 mm.; female, 2.85-3.0 mm. Width of head, male, 1.0 mm.; female, 1.1 mm.

Color. As in *T. signata*.

Structural Characteristics of Male. Head: As in *signata* except an eye is but three-fourths as wide as interocular space, and caudolateral angles of vertex are nearly right angles. *Prothorax:* As in *signata;* pronotum about 5½ times its median length, and about 1.8 times wider than the base of scutellum. *Scutellum:* About 3 times longer than median length of pronotum. *Hemelytra:* As in *signata.* Ratio of lengths of pronotum, scutellum and from apex of scutellum to apex of clavus is as 2:6:10 *Wings:* Present in both sexes. *Abdomen:* As in *signata. Claspers:* The right (Pl. XII, fig. 11) is not noticeably serrate ventrally, heel acute, much produced, ventral margin of clasper excavated immediately proximad to it, toe narrowed and produced; the left (Pl. XII, fig. 10) is rather simple, resembling that of *signata* and *serrata,* but toe is not produced and is rounded. *Legs:* As in *signata* except the fore tarsus has 14-15 bristle-like setae in lower row, 14-15 small setae in inner row and only 6-7 long hair-like setae in upper row; the middle-sized prong of the hind tarsal claw is only one-half as long as the longest.

Holotype. Male, Villa Rica, Paraguay, May, 1925 (F. Schade), in Museum at Helsingfors, Finland.

Allotype and *Paratypes.* As above.

Distribution (Pl. XIV): Bolivia, Brazil (Amazonas, Matto Grosso, Minas Geraes, Pará), Grenada, Paraguay, Perú, Trinidad.

Collection Data. Bolivia: Province del Sara, 2 females, Nov. 30, 1912 (J. Steinbach), 1 male, 2 females, Feb., 1913 (J. Steinbach), 1 male, 15 females, Dec., 1918 (J. Steinbach); Puerto Saurez, 2 females, alt. 500 feet (J. Steinbach); Rio Mapiri (W. M. Mann, Mulford Biol. Exp. 1921-'22); Santa Cruz de la Sierra, 1 male, 4 females, alt. 1,350 feet, Nov., 1910 (J. Steinbach).

Brazil: Manacapura, Solimoes river, Amazonas, 2 males, 2 females, June, 1926 (S. M. Klages); Corumba, Matto Grosso, 57 males, 84 females, Dec. 14 to 22, 1919 (R. G. Harris); Lassance, Minas Geraes, 11 males, 32 females, Nov. 9, 1919 (R. G. Harris); Piropara, Minas Geraes, 22 males, 44 females, Nov. 11, 12, 1919 (R. G. Harris); Para (Belem), 1 male, 2 females, Dec. 6, 1907; Pernambuco[14] (Recife), westwards of Olinda, a fresh-water pool on a roadside, 8 females, 1 nymph, Nov. 28, 1931 (Roszkowski and St. Feliksiak); Pernambuco, near Boa Viagem, large pool, 3 males, 1 female, 2 nymphs, Nov. 29, 1931 (Roszkowski and St. Feliksiak).

Grenada, Lesser Antilles: Woburn, 2 males, 4 females, no date, labeled P. R. Uhler Collection (Sauter and Smith); Woburn, 2 males and 3 females in U. S. National Museum collection, one of which is labeled P. R. Uhler Collection, no date (H. H. Smith). Uhler says "Nearly two dozen specimens of this species, including some varieties in size and color, were collected on most parts of the island. At Balthazar it was found July 11, flying at sunset after a heavy rain. On the Mount Gay and Telescope estates it was taken in August from spring water; but at Woburn it was more common, August 30, in a sluggish stream in the open country near sealevel."

Paraguay: Villa Morra, Asunción, 4 males and 6 females, no date (Vezenyi);[15] Caraveni, 3 males, 8 females, April 15, and 1 female, Oct. 30, 1924 (F. Schade); Molinasque, 1 male, 9 females, June 20, and 16 males, 28 females, Oct. 22, 1925 (F. Schade); Villa Rica, 1 female, Dec. 6, 6 females, July 3, and 2 females, July 16, 1923 (F. Schade); 9 males, 23 females, Feb. 21, 1924 (F. Schade); 2 females, Jan. 15, and the type specimens, May, 1925 (F. Schade).

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[14] The Pernambuco records are reported by Jaczewski. The writer has not seen these specimens.

[15] This is part of a long series which is deposited in the Museum at Budapest.

Perú: Puerto Bermudez, Río Pichis, 1 male, 2 females, July 12 to 19, 1920 (Cornell Univ. Exp.).

Trinidad: Prince Town, 2 specimens at light, Dec. 13, 1928 (J. G. Myers).

The writer has examined all of the material, about 350 specimens, mentioned above except the types and those reported by Jaczewski. The types were examined by Doctor Hungerford, who compared part of the writer's material with them. Doctor Lundblad has kindly informed the writer as to the disposition of the types, a matter not mentioned in the original description.

On the basis of our present knowledge of the distribution of the genus, this species is more widely distributed than any of the others It has been taken from Grenada, Lesser Antilles on the north to Villa Rica, Paraguay, on the south, and from Puerto Bermudez, Peru, on the west to Pernambuco, Brazil, on the east.

Comparative Notes. See this same heading under *T. signata.*

Tenagobia mexicana Deay

(Plate IX, fig. 5; Plate XII, figs. 6, 11; Plate XIII, fig. 3)

1930. *Tenagobia mexicana* Deay. Bull. Brook. Ent. Soc. XXV(3):174-175.
1894. *Sigara socialis* White (in part). Uhler, P. R. Proc. Zoöl. Soc. London: p. 224.
1901. *Tenagobia socialis* (White). Champion, G. C. Biol. Cent. Amer., Hemip-Heter. II:383.
1930. *Tenagobia signata* (White) (in part). Jaczewski, T. Mitt. Zool. u. Zool. Mus. Hamburg, XLIV:143-144.
1931. *Tenagobia signata* (White). Jaczewski, T. Ann. Mus. Zool. Polonici, IX(15):223.
1931. *Tenagobia socialis* (White). Jaczewski, T. Ann. Mus. Zool Polonici, IX(15):223.
1931. *Tenagobia mexicana* Deay. Jaczewski, T Ann. Mus Zool. Polonici, IX(15):223.

Size. Length, male, 2.55-2.7 mm.; female, 2.85-3.0 mm. Width of head, male, 0.97-1.0 mm.; female, 1.12-1.17 mm.

Color. As in *signata.*

Structural Characteristics of Male. Head: As in *signata,* but with caudolateral angles of vertex less acute and an eye ⅘ as wide as interocular space. The space between the posterior margin of eyes and the posterior margin of head greater than in the other species of the *signata* group, but this character is variable. *Prothorax:* As in *signata;* pronotum 6 times wider than median length. *Scutellum:* 1⅓ times wider than long. *Hemelytra:* As in *signata.* Ratio of lengths of pronotum, scutellum, and from apex of scutellum to apex of clavus is as 2:6:11. *Wings:* Present and well developed in both sexes. *Abdomen:* As in *signata. Claspers:* The right (Pl. XII, fig. 13) not serrate ventrally, the heel acute, caudal margin deeply excavated, toe much produced and rounded at apex; the left

(Pl. XII, fig. 6) very striking, the distal part somewhat hammer-shaped, the heel and toe both acutely angled and much produced. *Legs:* Front (Pl. XIII, fig. 3) the same as in *signata* except for the number of setae on the tarsus, there being 14-15 bristle-like setae in the lower row, 15-17 small setae in the inner row, and 8 long hair-like setae in the upper row. The middle leg as in *signata.* The tarsal claw of hind leg (Pl. IX, fig. 5) as in *signata.*

Holotype. Male, Nainari, Sonora, Mexico, August 19, 1927 (A. Dampf), in the Francis Huntington Snow Entomological Collection.

Allotype. As above.

Paratypes. Thirty-eight males, sixty females, as above.

Distribution (Pl. XIV): California (?) (*socialis* specimens reported by Uhler), Guatemala, Mexico (Chiapas, Guerrero, Morelos, Nayarit, Sinaloa, Sonora, Tabasco, Tamaulipas, Tepic, Veracruz), Panamá.

Collection Data. Guatemala: Paso Antonio, 2 males, 4 females, altitude 44 feet, Feb. 19-28, 1881 (G. C. Champion).

Mexico: Huixtla, Chiapas, 7 specimens taken at light in hotel room, altitude about 135 feet, and 76 specimens taken at trap light on shores of Huixtla river ("The bed of the river is filled with boulders and gravel, the current is swift and there are small cataracts. Huixtla is nearly thirty kilometers from the sea (Pacific) immediately where the Sierra Madre begins to arise"—from notes accompanying the specimens), Nov. 21, 1930 (A. Dampf); Tlapahuala, Guerrero, 2 females at lights on shore of Balsas river, altitude about 660 feet, Aug. 23, 1930 (Public Health Inspector of Mexico); Cuernavaca, Morelos, 1 female, March 5, 1928 (A. Dampf); Acaponeta, Nayarit, 1 male, Nov. 2, 1923 (J. H. Williamson); Presido de Mazatlán, Sinaloa, 1 female (A. Forrer); Nainari, Sonora, types, at light at house of General Obregón, near Yaqui river, Aug. 19, 1927 (A. Dampf); Teapa, Tabasco, 2 females, 1888 (H. H. Smith); El Mante, Tamaulipas, 1 male, 2 females, at light, altitude about 330 feet, Oct. 26, 1930 (A. Dampf); Hac de Ixtapa, Tepic, 2 males, 3 females, 1908 (P. Hacker); Santa Lucrecia, Veracruz, 16 males, 34 females, Nov. 9, 1930 (A. Dampf); Cardel, Veracruz, 9,872 specimens, at light on shore of Rio San Francisco, August, 1932 (R. Soto).

Panamá: David, 1 female, 1881 (G. C. Champion).

The writer has examined all of the above specimens.

Uhler says that *T. socialis* occurs in California. The writer has been unable to locate any specimens of Tenagobia which have been taken in California, although he has seen several specimens of Tenagobia which were in Uhler's collection. These had, however, all been taken on the Island of Grenada. It seems logical that the California specimens to which Uhler referred were specimens of *mexicana,* since it is the only species of Tenagobia known to occur north of Central America.

The specimens of *T. mexicana* collected by P. Hacker at Hac de Ixtapa, Tepic, and deposited in the Zoologische Staatsinstitut und Zoologische Museum at Hamburg were misidentified by Jaczewski as *signata.*

The specimens collected by Forrer, Smith and Champion and deposited in the British Museum (Natural History) are the ones referred to as *T. socialis* in "Biologia Centrali Americana."

Comparative Notes. See this heading under *T. signata.*

Tenagobia serrata Deay

(Plate XII; figs. 7, 15)

1930 *Tenagobia serrata* Deay Bull Brook Ent. Soc, XXV(3) 175-176

Size. Length, male, 2.55 mm.; female, 3.0-3.1 mm. Width of head, male, 1.0 mm.; female, 1.2 mm.

Color. Much as in *T. signata,* except that the legs are uniform yellow in the specimens known.

Structural Characteristics of Male. Head: As in *T. signata* except that an eye is about four-fifths as wide as interocular space and caudolateral angles of vertex are more acute. *Prothorax:* As in *signata. Scutellum:* 2½ times wider than long. *Hemelytra:* As in *signata.* Ratio of lengths of pronotum, scutellum and from apex of scutellum to apex of clavus is as 6:15:30. *Wings:* Present in both sexes. *Abdomen:* As in *signata. Claspers:* The right (Pl. XII, fig. 15) with a double row of serratures ventrally, the heel very acute, a deep excavation immediately proximad to it, the toe somewhat produced and rounded; the left (Pl. XII, fig. 7) rather simple, heel not developed, toe pointed, resembles that of *signata* closely. *Legs:* As in *signata.*

Holotype. Male, Lower Mamore river, December, 1913 (J. Steinbach), in the Carnegie Museum.

Allotype and *Paratypes.* Eight females, as above.

Distribution (Pl. XIV): Only the type specimens have been taken.

Comparative Notes. See under *T. signata.* This species seems to be between *signata* and *socialis*, the right clasper resembling that of *socialis* and the left that of *signata.*

Tenagobia socialis (White)

(Plate XII, figs. 9, 14; Plate XIII, fig. 2; wash drawing No. 16, Plate V)

1879. ***Sigara socialis*** White. Trans. Ent. Soc. London, XVII:274-275.

1894. ***Sigara socialis*** White. Uhler, P. R. Proc Zoöl. Soc. London:224. (Mistaken identity.)

1901. ***Tenagobia socialis*** (White). Champion, G. C. Biol. Cent. Amer Hemip.-Heter. II:383. (Mistaken identity.)

1928. ***Tenagobia signata*** var. ***socialis*** (White). Lundblad, O. Ark. f. Zoöl. Bd. XXA(7):16.

1930. ***Tenagobia signata*** (White) (in part). Jaczewski, T Mitt. Zool. Staats. u. Zool. Mus Hamburg, XLIV:143-144.

1931. ***Tenagobia socialis*** (White). Jaczewski, T. Ann. Mus. Zool. Polonici, IX:223. (Mistaken identity.)

Size. Length male, 2.25-2.75 mm.; female, 2.6-2.9 mm. Width of head, male, 1.0 mm.; female, 1.2 mm.

Structural Characteristics of Male. Head: About the same as in *signata* except that the vertex is wider in proportion to the total width of head, an eye being about three-fourths as wide as interocular space, and the caudolateral angles of the vertex are more produced laterally. *Prothorax:* As in *signata*; pronotum 6 times wider than median length, about 1.7 times wider than base of scutellum. *Hemelytra:* As in *signata.* Ratio of lengths of pronotum, scutellum and from apex of scutellum to apex of clavus is as 2:6:10. *Wings:* Present in both sexes. *Abdomen:* As in *signata. Claspers:* The right (Pl. XII, fig. 14) serrate ventrally, the heel acute, much produced, toe rounded; the left (Pl. XII, fig. 9) differing from all others in the *signata* group in the shape of the distal end. *Legs:* As in *signata* except that there are only 6-7 long hair-like setae on the fore tarsus (Pl. XIII, fig. 2).

Cotypes. Rio Maderia up to São Antonio da Boa Vista, June, 1874; Rio Trombetas, March, 1875, and Manãos, Brazil, August, 1875 (J. W. H. Traill), in Perth Museum, Perth, Scotland, and British Museum (Natural History). White also gives Anana, Upper Amazon, Sept., 1874, and Urubu Caxoeira, Rio Jurus, Nov., 1874 (J. W. H. Traill), as type localities.

Distribution. (Pl. XIV): Brazil (Manãos, Rio Maderia, Rio Trombetas, Santarem), British Guiana, Dutch Guiana.

Collection Data. Brazil: Manãos, cotypes, Aug., 1875 (J. W. H. Traill); Rio Maderia up to São Antonio da Boa Vista, cotypes, June, 1874 (J. W. H. Traill); Rio Trombetas, cotypes, March, 1875 (J. W. H. Traill); Santarem, 7 males, 15 females, Dec. 10-11, 1909.

British Guiana: East Coast Demerara river, July 20, 1932, Aug. 2, 1932, Aug. 25, 1932 (S. Harris); Lamaha Conservancy, east coast, Demerara river, 26 males and 32 females, Aug. 2, 1932 (S. Harris); Canal Polder No. 2, west bank, Demerara river, 4 males and 22 females, Aug. 25, 1932 (S. Harris); Georgetown, 13 males, 25 females, at light on Middle street, Jan. 27, 1927 (L. D. Cleare, Jr.); Koriabo, Barima river, 1 female, at light, May 5, 1929 (J. G. Myers); Tumatumari, 7 males and 12 females, July 19, 1923 (F. X. Williams).

Dutch Guiana: Cottica, Para District, several specimens, no other data; Paramaribo, many specimens, both male and female, no date (C. Heller).

White says of the cotypes, "Many specimens taken at light, etc." The writer has examined 5 male and 3 female cotypes from Manãos. He examined none from the Trombetas river, but he has examined specimens from Santarem, which is within a hundred miles of the Trombetas. All of the other material mentioned under "Collection data" has been examined by the writer. White also places the specimens taken by Traill at Anana, Upper Amazon and at Urubu Caxoeira, Rio Jurua, in this species. The writer has not seen any of these specimens, but believes that since they were taken at the same time and in the same localities as the cotypes of *signata* that they belong to that species.

The *socialis* specimens mentioned by Champion are *mexicana*. The specimens collected by Heller at Paramaribo, Dutch Guiana, and deposited in the Zoologische Staatsinstitut und Zoologischen Museum at Hamburg were misidentified as *signata* by Jaczewski. The specimens collected in Grenada and referred to this species by Uhler belong to *incerta*.

Lundblad reduced *socialis* to a variety, but as stated elsewhere, the writer believes it to be of specific rank.

Comparative Notes. See this heading under *T. signata*.

Tenagobia selecta (White)

(Plate IX, figs. 1, 2, 3, 6, 9, 11, 12; Plate X, figs. 9, 17-22; Plate XI, figs, 11, 14; Plate XIII, fig. 10)

1879. *Sigara selecta* White. Trans. Ent. Soc. London, XVII:273.

1927. *Tenagobia selecta* (White). Hungerford, H. B. Proc. Ent. Soc. Wash., XXIX(8): 189.

1928. *Tenagobia selecta* (White). Lundblad, O. Ark. f. Zool., XXA(7):9-13

Size. Length, male, 4.2-4.6 mm.; female, 4.4-4.8 mm. Width of head, male, 1.6-1.8 mm.; female, 1.7-1.9 mm.

Color. Varies from a uniform light brown to a mottled dark brown above; front and vertex usually yellowish transparent, the yellow more noticeable in the darker individuals; lateral margins of hemelytra lighter, each with two large deep brown maculations, a transparent V-shaped figure near the base of each clavus, the membranal suture of right hemelytron transparent. Ventral aspect of thorax yellowish, of the abdomen darker; legs and antennae yellowish.

Structural Characteristics of Male. Head (Pl. IX, fig. 2, Pl. X, fig. 22): Posterior margin of the vertex right angled; an eye about 1¼ times wider than interocular space; posterior margin of the eyes distinctly separated from the posterior margin of the head. *Prothorax* (Pl. X, fig. 17): No mustache-like bristles on lateral margins; pronotum very short, 7 times wider than median length, posterior margin not truncate in front of bases of hemelytra, narrowed at ends. *Scutellum:* Varies in size according to the extent that the wings are developed; in winged specimens it is twice as long and wide as in the wingless ones. *Hemelytra:* Membrane well developed in winged individuals and much reduced in wingless ones of both sexes, the right membranal suture distinct; many minute peg-like setae scattered irregularly over entire hemelytra; numerous extremely long, fine setae distally; a deep longitudinal furrow near each lateral margin in which there is a row of fairly large setae. Ratio of lengths of pronotum, scutellum and from apex of scutellum to apex of clavus varies according to the development of the wings; in wingless forms it is as 11:22:113; in individuals with small functionless wings it is as 11:38:115; in winged forms it is as 11:45:105. *Wings:* Present, absent, or small and useless for flight. This is true for both sexes. *Abdomen* (Pl. XIV, figs. 9, 12): 5th segment with 1 short spine-like seta on either side; 6th and 7th segments each with 3 short spine-like setae on either side, the right side of 6th tergite with a diagonal cleft along which is a row of short setae; 8th segment with four lateral and 1 terminal spine-like setae on either side; the tergite lobe is strikingly different from that of the other species, being elongated into a finger-like process, the caudal margin with a brush of hair-like setae gradually elongated from left to right. *Claspers:* The left (Pl. XI, fig. 11) is divided into three distinct regions, a strong, brown basal part, a shaft-like central part and a greatly expanded, leaf-like, transparent, distal part which is beset with numerous papillae; the right (Pl. XI, fig. 14) with a broad base, a slender middle part which has a dorsal hump toward the distal end, and an enlarged distal part, constricted between middle and distal parts. *Legs:* Foreleg (Pl. XIV, fig. 10) with a row of from 7-9 spine-like setae on lower side of femur; tarsus large, nearly twice the length of tibia, 16-18 bristle-like setae on lower margin, 12-15 setae in inner row, 5-13 long hair-like setae in upper row. Ratio of lengths of femur, tibia, tarsus and tarsal claws of middle leg (Pl. IX, fig. 11) is as 123:38:52:27. Tarsal claw of hind leg (Pl. IX, figs. 3, 6) two-pronged.

Cotypes. Manãos, Brazil, "many specimens," "at light," August, 1875 (J. W. H. Traill) in the Perth Museum, Perth, Scotland, and the British Museum (Natural History).

Distribution (Pl. XIV): Bolivia, Brazil (Manacapura, Manãos, Rio Autaz), Paraguay.

Collection Data. Bolivia: Ivon Bení, 24 specimens, February (W. M. Mann, Mulford Biol. Exp. 1921-'22). All of these specimens have well-developed wings.

Brazil: Manacapura, Amazonas, 85 males, 111 females, June, 1926, and 40 females, March, 1928 (S. M. Klages); Manãos, many specimens, at light, August, 1875 (J. W. H. Traill), cotypes; Rio Autaz (near Manãos), October, 1924 [A. Roman, reported by Lundblad]. The specimens collected by Klages are either wingless or with very small wings; the cotypes are winged.

Paraguay: Villa Rica, August, 1926 (F. Schade). This is the first time that *selecta* has been reported from Paraguay and this record extends its known range over a thousand miles.

The writer has examined 6 of the cotypes and all of the other material known except the specimens taken by Roman in the Rio Autaz.

Comparative Notes. T. selecta is the largest of the known species of Tenagobia. It belongs to the group which is characterized by the absence of mustache-like bristles on the lateral margin of the prothorax, but it does not seem to be close to any of the other species of this group. It can be easily distinguished from the other species of the genus by the tergite lobe of the 8th abdominal segment (Pl. IX, fig. 12).

PLATE IX

Fig. 1. Tibia-tarsus, foreleg, female, *T. selecta* (White)
Fig. 2. Head, male, *T. selecta* (White).
Fig. 3. Hind tarsal claw, male, *T. selecta* (White).
Fig. 4. Dorsal aspect, *T. costaricana* Jaczewski.
Fig. 5. Hind tarsal claw, male, *T. mexicana* Deay.
Fig. 6. Hind leg, male, *T. selecta* (White).
Fig. 7. Dorsal aspect, male, *T. fuscata* (Stal).
Fig. 8. Dorsal aspect, male, *Micronecta pronuba* Distant.
Fig. 9. Ventral aspect of abdomen, male, *T. selecta* (White).
Fig. 10. Dorsal aspect of abdomen, male, *M. pronuba* Distant; *s*—strigil.
Fig. 11. Middle leg, male, *T. selecta* (White).
Fig. 12. Dorsal aspect of abdomen, male, *T. selecta* (White).

PLATE IX

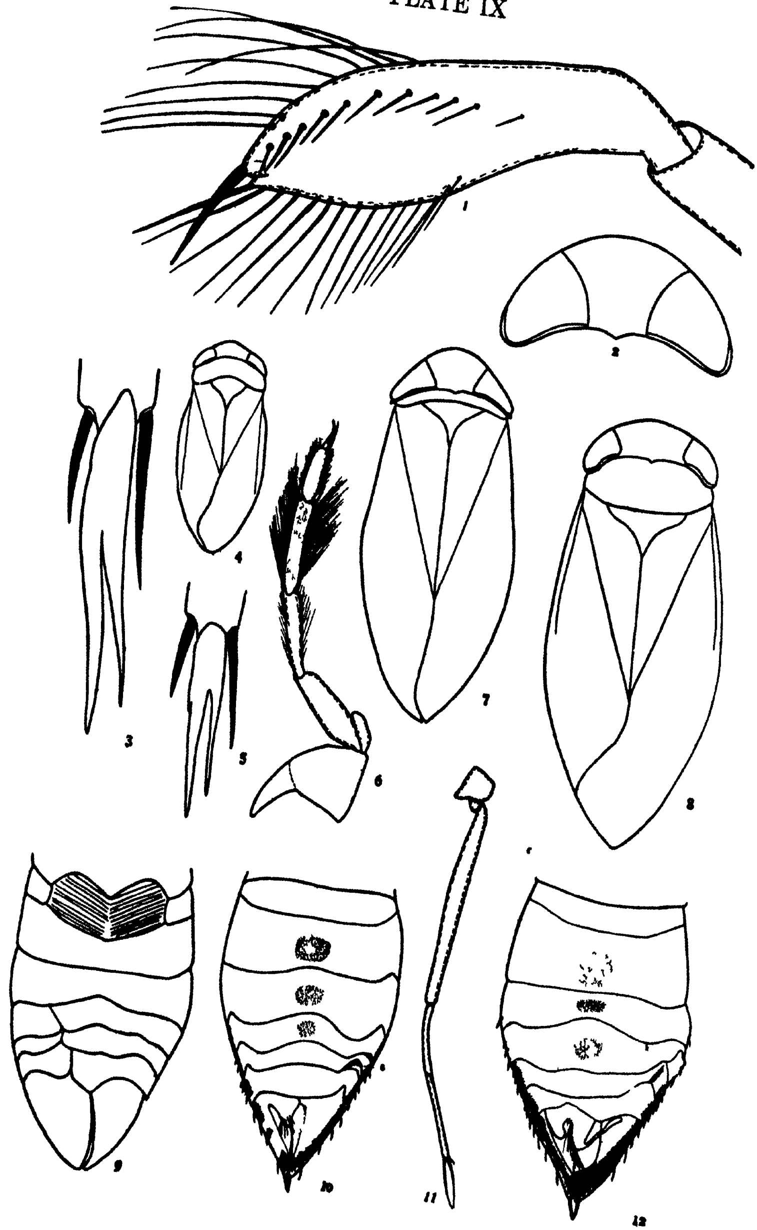


PLATE X

FIG. 1. Head and pronotum, *T. truncata* Deay.

FIG. 2. Left part 8th abdominal segment, male, *T. costaricana* Jaczewski.

FIG. 3. Head, *T. hungerfordi* Deay.

FIG. 4. Head, pronotum, scutellum, *T. constricta* Deay.

FIG. 5. Left part 8th abdominal segment, male, *T. pulchra* Hungerford. (Drawn to a larger scale than same structure in other species.)

FIG. 6. Left part 8th abdominal segment, male, *T. constricta* Deay.

FIG. 7. Left part 8th abdominal segment, male, *T. socialis* (White).

FIG. 8. Genital capsule and penis, *T. constricta* Deay.

FIG. 9. Antenna, *T. selecta* (White).

FIG. 10. Left part 8th abdominal segment, male, *T. romani* Lundblad. (Redrawn after Lundblad.)

FIG. 11. Left part 8th abdominal segment, *T. fuscata* (Stal).

FIG. 12. Left part 8th abdominal segment, *T. hungerfordi* Deay.

FIG. 13. Front aspect, prothorax, *T. hungerfordi* Deay.

FIG. 14. Left part 8th abdominal segment, *T. schadei* Lundblad. (Redrawn after Lundblad.)

FIG. 15. Left part 8th abdominal segment, *T. truncata* Deay.

FIG. 16. Left part 8th abdominal segment, *T. melini* Lundblad. (Redrawn after Lundblad.)

FIG. 17. Front aspect, prothorax, *T. selecta* (White).

FIG. 18. Right mandible, male, *T. selecta* (White).

FIG. 19. Right maxilla, male, *T. selecta* (White).

FIG. 20. Left maxilla, male, *T. selecta* (White).

FIG. 21. Left mandible, male, *T. selecta* (White).

FIG. 22. Head and foreleg, male, *T. selecta* (White).

PLATE X

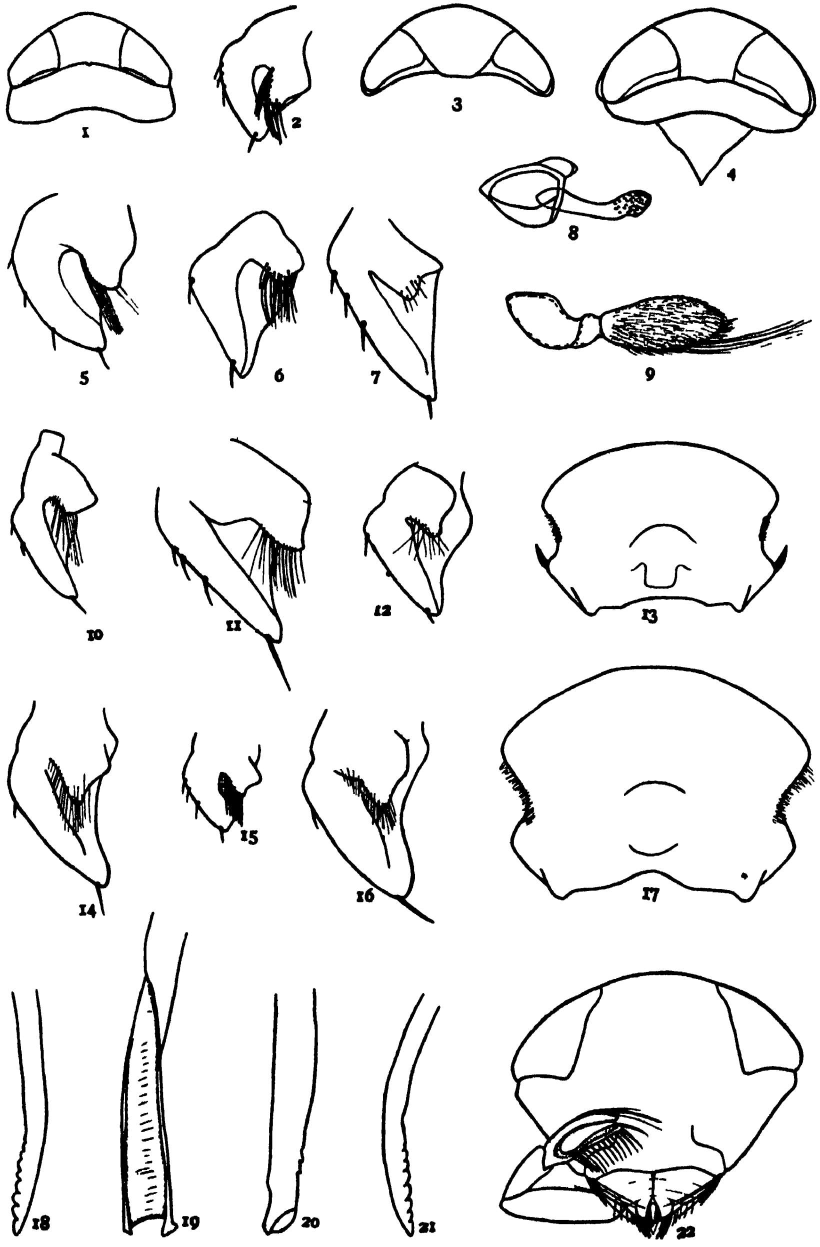


PLATE XI

FIG. 1. Right clasper, *T. schadei* Lundblad. (Redrawn after Lundblad.)

FIG. 2. Left clasper, *T. hungerfordi* Deay.

FIG. 3. Left clasper, *T. schadei* Lundblad. (Redrawn after Lundblad.)

FIGS. 4 and 5. Left and right claspers, *T. romani* Lundblad. (Redrawn after Lundblad.)

FIGS. 6 and 7. Left and right claspers, *T. constricta* Deay.

FIGS. 8 and 9. Left and right claspers, *T. fuscata* (Stal).

FIG. 10. Right clasper, *T. hungerfordi* Deay.

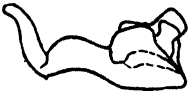
FIG. 11. Left clasper, *T. selecta* (White).

FIGS. 12 and 13. Right and left claspers, *T. melini* Lundblad. (Redrawn after Lundblad.)

FIG. 14. Right clasper, *T. selecta* (White).

Figures 2, 6, 7, 8, 9, 10, 11, 14 drawn to the same scale from microscopic mounts which were studied under a magnification of 450 ×.

PLATE XI



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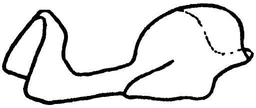

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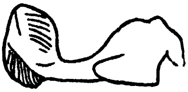

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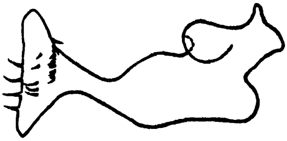

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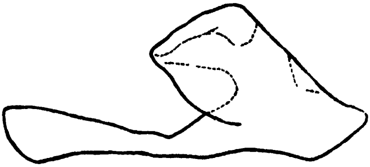

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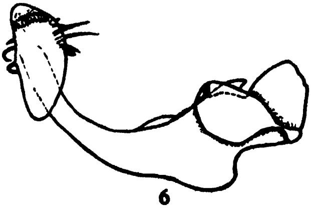

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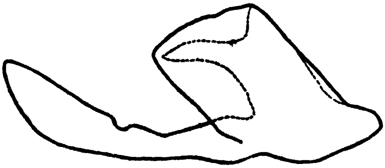

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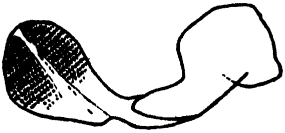

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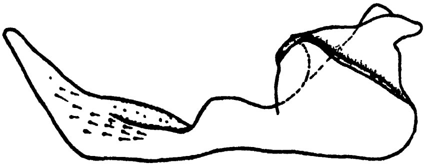

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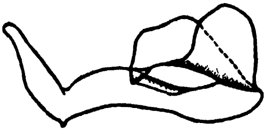

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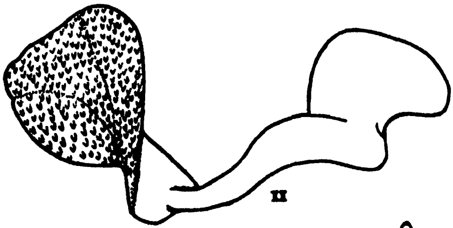

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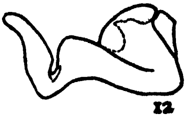

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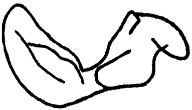

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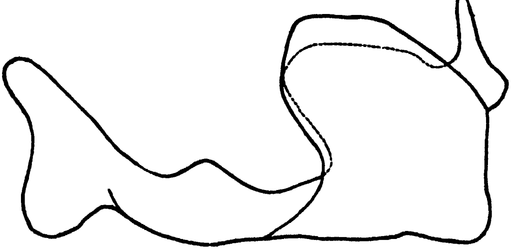

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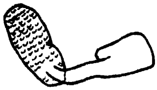
PLATE XII

FIG. 1. Left clasper, *T. costaricana* Jaczewski.
FIG. 2. Left clasper, *T. pulchra* Hungerford.
FIG. 3. Left clasper, *T. truncata* Deay.
FIG. 4. Right clasper, *T. costaricana* Jaczewski
FIG. 5. Right clasper, *T. pulchra* Hungerford.
FIG. 6. Left clasper, *T. mexicana* Deay.
FIG. 7. Left clasper, *T. serrata* Deay.
FIG. 8. Left clasper, *T. signata* (White).
FIG. 9. Left clasper, *T. socialis* (White).
FIG. 10. Left clasper, *T. incerta* Lundblad.
FIG. 11. Right clasper, *T. incerta* Lundblad.
FIG. 12. Right clasper, *T. signata* (White).
FIG. 13 Right clasper, *T. mexicana* Deay.
FIG. 14. Right clasper, *T. socialis* (White).
FIG. 15. Right clasper, *T. serrata* Deay.

All figures are drawn to the same scale from microscopic mounts which were studied under a magnification of 450 ×.

PLATE XII



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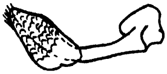

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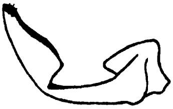

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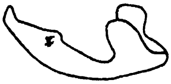

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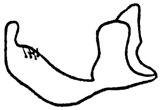

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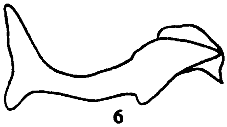

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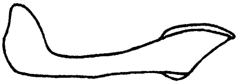

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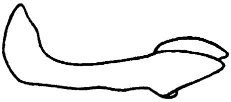

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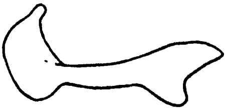

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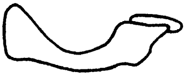

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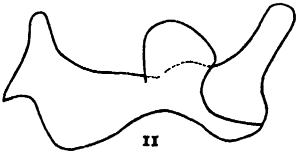

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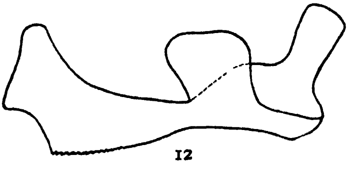

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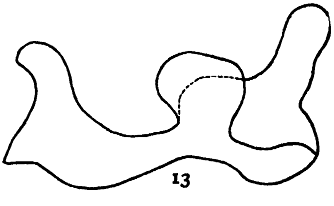

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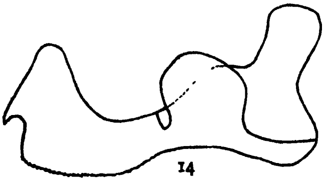

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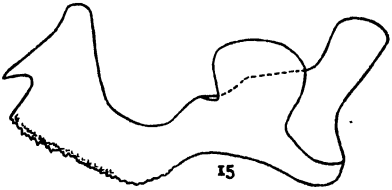

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PLATE XIII

Inner Aspect of Forelegs of Males

FIG. 1. *T. truncata* Deay.
FIG. 2. *T. socialis* (White).
FIG. 3. *T. mexicana* Deay.
FIG. 4. *T. melini* Lundblad. (Redrawn after Lundblad.)
FIG. 5. *T. fuscata* Stal.
FIG. 6. *T. romani* Lundblad. (Redrawn after Lundblad)
FIG. 7. *T. hungerfordi* Deay.
FIG. 8. *T. constricta* Deay.
FIG. 9. Fore tarsal claw, *T. constricta* Deay.
FIG. 10. *T. selecta* (White).
FIG. 11. *T. costaricana* Jaczewski.
FIG. 12. *T. pulchra* Hungerford.

All figures, except 4 and 6, drawn to the same scale from microscopic mounts which were studied under a magnification of 450 ×.

PLATE XIII

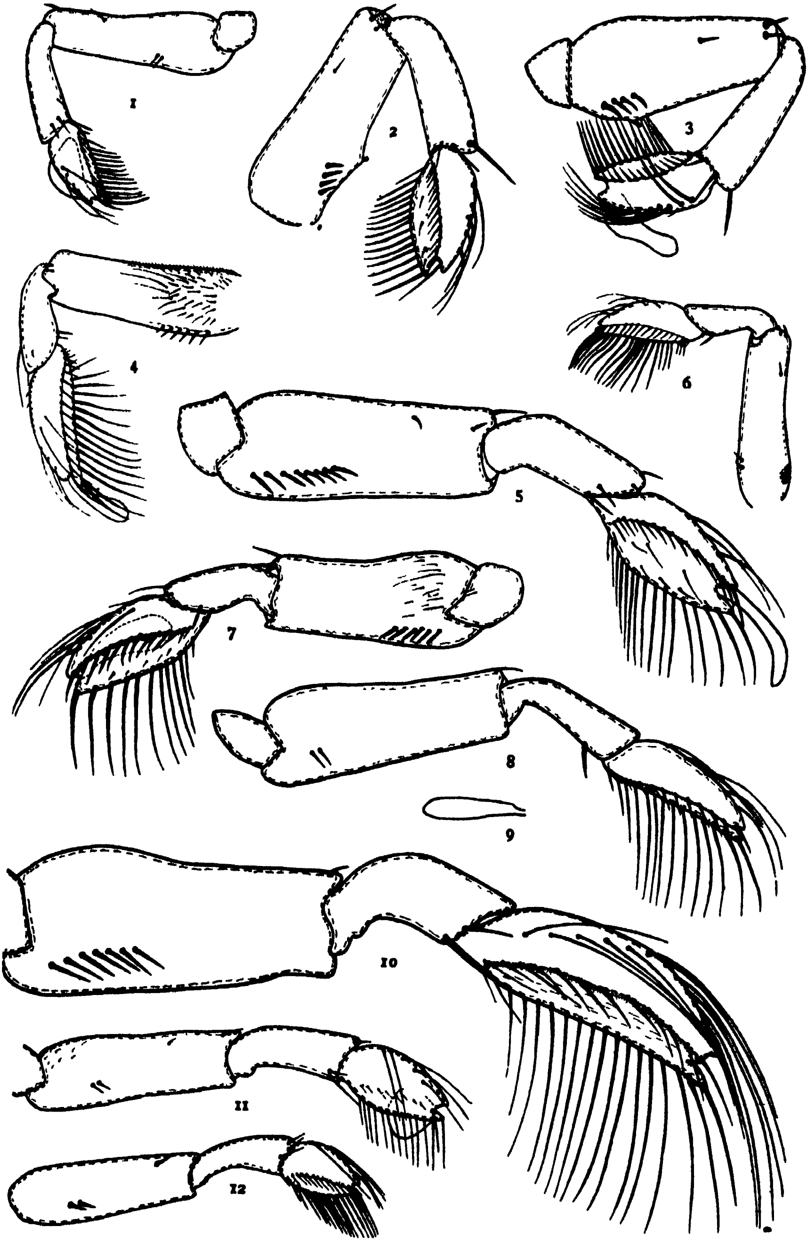


PLATE XIV

Map showing localities in which specimens of Tenagobia have been collected.

FIG. 1. California—*T. mexicana* (?). Reported by Uhler.

FIG. 2. Nainari, Sonora—*T. mexicana* Deay. Type locality.

FIG. 3. Mazatlán, Sinaloa—*T. mexicana.*

FIG. 4. Acaponeta, Nayarit—*T. mexicana.*

FIG. 5. Hac de Ixtapa, Tepic—*T. mexicana.*

FIG. 6. El Mante, Tamaulipas—*T. mexicana.*

FIG. 7. Tlapahuala, Guerrero—*T. mexicana.*

FIG. 8. Cuernavaca, Morelos—*T. mexicana.*

FIG 9. Cardel, Río San Francisco, Vera Cruz—*T. mexicana*

FIG 10. Santa Lucrecia, Veracruz—*T. mexicana.*

FIG. 11. Teapa, Tabasco—*T. mexicana.*

FIG. 12. Huixtla, Chiapas—*T. mexicana.*

FIG. 13. Paso Antonio, Guatemala—*T. mexicana.*

FIG. 13a. Near Tela, Honduras—*T. costaricana* Jaczewski.

FIG. 14. Farm Hamburg, Reventazon, Costa Rica—*T. costaricana.* Type locality.

FIG. 15. David, Panamá—*T. mexicana.*

FIG. 16. Boqueron River, Panamá—*T. costaricana.*

FIG. 17. Venezuela—*T. marmorata* Bergroth. Type locality.

FIG. 18. Grenada, Lesser Antilles—*T. incerta* Lundblad.

FIG. 19. Trinidad—*T. incerta.*

FIG. 20. Tumatumari, British Guiana—*T. socialis* (White)

FIG. 21. Georgetown, British Guiana—*T. socialis.*

FIG. 22. Demerara River, British Guiana—*T. socialis.*

FIG. 23 Paramaribo, Dutch Guiana—*T. socialis.*

FIG. 24. Cottica, Dutch Guiana—*T. socialis.*

FIG. 25. Tena, Ecuador—*T. truncata* Deay and *T. constricta* Deay. Type locality.

FIG. 26. Tonantins, Brazil—*T. signata* (White).

FIG. 27. Rio Jurua—*T. signata.*

FIG. 28. Rio Purus—*T. signata.* Type locality.

FIG. 29. Manacapura, Amazonas—*T. selecta* (White) and *T. incerta.*

FIG. 30. Manãos, Amazonas—*T. melini* Lundblad (type locality), *T. romani* Lundblad (type locality), *T. selecta* (type locality), *T. socialis.*

FIG. 31. Rio Autaz, left tributary of Madeira—*T. selecta.* Reported by Lundblad.

FIG. 32. Trombetas River—*T. socialis.* Type locality.

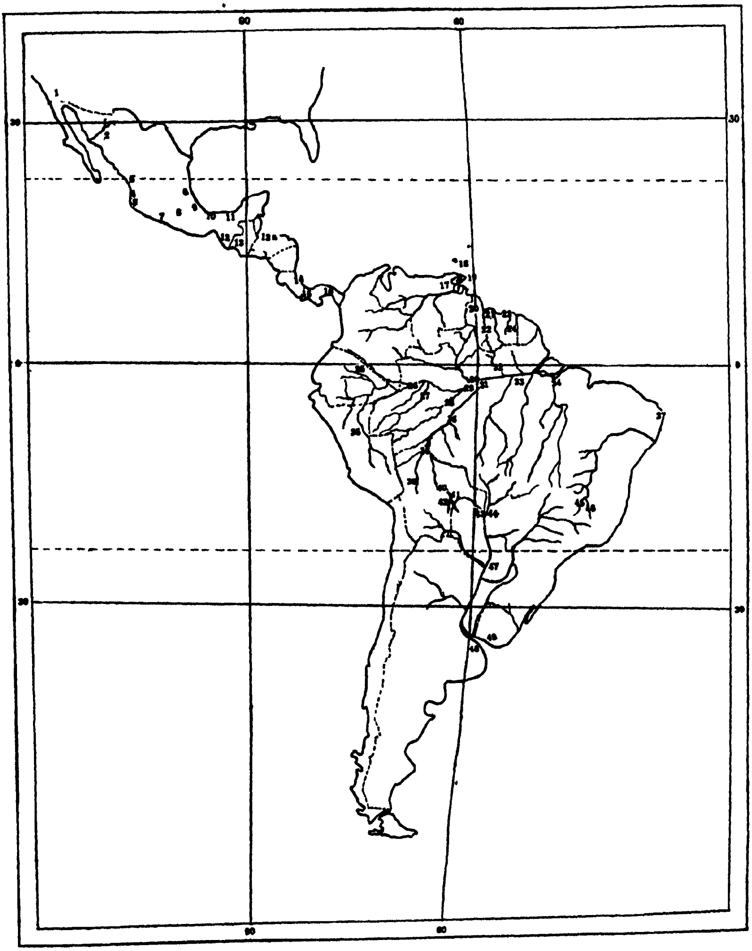
FIG. 33. Santarem, Para—*T. socialis.*

FIG. 34. Pará, Pará—*T. incerta.*

FIG. 35. Puerto Bermudez, Río Pichis, Perú—*T. incerta.*

FIG. 36. São Antonio da Boa Vista, Madeira River—*T. socialis.* Type locality.

PLATE XIV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60

PLATE XIV—CONCLUDED

FIG. 37. Pernambuco (Recife), Pernambuco—*T. incerta* and *T. schadei* Lundblad. Reported by Jaczewski.

FIG. 38. Ivon Beni, Bolivia—*T. selecta.*

FIG. 39. Río Bení at mouth of Río Mapiri—*T. pulchra* Hungerford (type locality) and *T. incerta.*

FIG. 40. Lower Mamore River—*T. serrata* Deay. Type locality.

FIG. 41. Province del Sara, Bolivia—*T. hungerfordi* Deay and *T. incerta.*

FIG. 42. Santa Cruz de la Sierra, Bolivia—*T. incerta.*

FIG. 43. Puerto Saurez, Bolivia—*T. incerta.*

FIG. 44. Corumba, Matto Grosso—*T. hungerfordi* (type locality) and *T. incerta.*

FIG. 45. Piropara, Minas Geraes—*T. incerta.*

FIG. 46 Lassance, Minas Geraes—*T. incerta.*

FIG. 47. Paraguay—*T. fuscata* (Stal) at Albovena Srojoguasi and Villa Rica; *T. hungerfordi* at Villa Rica; *T. incerta* at Asunción, Caraveni, Molinasque and Villa Rica (type locality); *T. schadei* at Villa Rica (type locality); *T. selecta* at Villa Rica.

FIG. 48. Buenos Aires, Argentina—*T. fuscata.*

FIG. 49. Montevideo, Uruguay—*T. fuscata.* Type locality.

STENOCORIXINAE subfamily new

Although this subfamily does not occur in the Americas and is represented by a single species, *Stenocorixa protrusa* Horvath, found only in Africa, we are characterizing the new subfamily here.

Rostrum with prominent transverse sulcations. Hypo-ocular suture indistinct. Hypopharyngeal plate with stout sclerotized denticles. Antennae quite long. Pala slender with a moderately developed palm. Scutellum covered by the pronotum. Hemelytra without an embolar groove but with a well developed nodal furrow. Meta-episternum partly divided by a suture. Meron broad. Male abdominal asymmetry but slightly developed.

So slight is the male asymmetry that Doctor Horvath [1] (1926), who described the genus and species from a single male specimen, thought he had a female. However, Jaczewski [2] (1927) examined two females and was able to point out the error. Poisson and Jaczewski [3] (1928) gave some very useful notes on the morphology of the species.

CYMATIINAE subfamily new

Rostrum without transverse sulcations. Pala elongate, nearly cylindrical, with a poorly defined palm. Scutellum covered by the pronotum. Hemelytra with embolar groove. Nodal furrow absent, the media vein appearing to curve abruptly downward to costal margin without making contact with cubitus. The location and direction of this curved portion of media suggests a nodal furrow. There is, however, no indication of a cleavage plane which is characteristic of a nodal furrow.

Mr. Walton, 1940, proposed the tribe Cymatiini but without the evidence of the venation of the hemelytra which we consider of subfamily significance. All of the species so far known belong to the genus *Cymatia*. Walton's assignment of *Neocorixa* Hungerford to his Cymatiini is not justified.

Cymatia Flor

1860. Flor, Gustav. Archiv für Naturkunde Livlands . . (2), iii, 783. (= Die Rhynchoten Livlands) (*Cymatia* a new subgenus of "*Corisa* Geoffroy" to include *C. coleoptrata* Fabr. and *C. bonsdorffii* Sahlbg.)

1898. Kirkaldy, G. W. The Entomologist, XXXI, p 252 (Cites *C. coleoptrata* (Fabr.) as type of the subgenus.)

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[1] 1926 Horvath, G., Arkiv. für Zoologi XVIII, A, No. 31, pp. 2-4, fig. 1.

[2] 1927 Jaczewski, T., Ann. and Mag. Nat. Hist. London, 9/XX, pp. 440-443, figs. 7-12.

[3] 1928 Poisson, R., and Jaczewski, T., Annales Musei Zool. Polonici, VII, pp. 115-120, Plates XVII and XVIII.

1901. Kirkaldy, G. W. Jl. of Quekett Microscopical Club (2) VIII, pl. 3, fig. 5. (*Cymatia* to generic rank.)

1923. Butler, E. A. Entomologists Monthly Magazine, LIX, pp. 161-162.

1926. Blatchley, W S Heteroptera of Eastern North America, pp. 1066-1067.

1928. Jaczewski, T. Annales Musei Zoologici Polonici, VII, pp. 53, 55, 56, 63 and 64.

1930 Jones, H P. Entomologist's Record, XL-XLII; reprint, p. 77.

1935. Poisson, R. Archives de Zoologie Exp et Gén., LXXVII, pp. 458, 486.

1936. Poisson, R Bull de la Societe Scientifique de Bretagne, XIII, Fasc. 1 and 2, p. 8.

1938. China, W. E. The Entomologists Monthly Magazine, LXXIV, p. 39.

1943. Walton, G. A. Trans. Soc for British Entomology VIII, Pt. 5, pp 155, 162, 165. (Diploid chromosome number of 26.)

This well-defined genus may be characterized as follows: Face short, infraocular area reduced. Beak not cross-ridged. Postocular area of head broad. Front tibia short. Pala long and narrow with few palmar hairs. Male pala ending in a broad, thickened elongate claw. Pronotum with median longitudinal carina at least on anterior half, its surface shining without distinct dark cross bars. Male abdominal asymmetry dextral. Strigil absent. The females of *C. americana* Hussey, *C. coleoptrata* (Fabr.) and *C. bonsdorffi* Sahlb. place their eggs on pedicels, and this habit is probably generic. While not more than a half dozen species are known, the genus is represented in China, India, Turkestan, the Caucasus, Algeria, Europe, Siberia and North America.

Genotype: C. coleoptrata (Fabr.)

Cymatia americana Hussey

(Plate XV)

1920. *Cymatia americana* Hussey, R. F Bull. Brooklyn Ent Soc., XV, pp. 80-83, Pl. 1.

1921. *Cymatia americana*, Hussey, R F Psyche, XXVIII, p 93. (Collected on January 15 in air bubbles in the ice.)

1923. *Cymatia americana*, Hungerford, H. B. Bull. Brooklyn Ent Soc., XVIII, pp 14-15, Pl. I, figs. 3, 4, 5. (Figures egg and 1st instar)

1926. *Cymatia americana*, Blatchley, W S. Heteroptera of Eastern North America, p. 1067.

Size: Length 5.88 mm. to 8.3 * mm.; width across head 1.97 mm. to 2.6 mm.

Color: "General color above dark olive-green in living individuals, marked with black; in pinned specimens the green rapidly fades to yellowish brown. Head green, broadly infuscated behind. Pronotum dark olive-green to olive brown in life, the margin narrowly blackish. Hemelytra olive green, marked with black. Clavus with oblique black lineations which are usually heaviest near its base; the lines somewhat forked and broken, not reaching the inner angle, more irregular and sometimes confluent on the apical part. Corium sparsely and irregularly punctate with black, and with

---

* According to Hussey. I have seen none longer than 8 mm.

numerous irregular blackish maculae which are commonly heaviest near the apex of the clavus and which tend to form two or three indefinite longitudinal series. Embolium whitish, externally margined with fuscous on the posterior part. Membrane very lightly irrorate with fuscous, marked off from corium by a black line. Sterna, coxae and trochanters fuscous; mesosternal xyphus yellow, infuscated at base; pleura whitish. Legs yellow. Male abdomen blackish, marked with yellow above. Female abdomen green in life, apical segment brownish." (From Hussey, 1920.)

Structural characteristics: Head slightly longer than the pronotal disk as viewed from above, its anterior margin broadly rounded and protruding beyond the eyes. Vertex with slight depression on either side of the median line. Front broadly flattened in both sexes, coarsely punctured on either side and with long whitish pubescence which is erect in living specimens. Last antennal segment much more slender and more hairy and half the length of the thickened third.

Pronotum subshining, very minutely rastrate, about twice as wide as it is long, the lateral submargin very slightly impressed. Median longitudinal carina sometimes becoming obsolete on the posterior third of the disk; anterior margin of pronotum lightly emarginate, posterior margin very slightly sinuate.

Hemelytra with clavus rugulose; corium sparsely and irregularly punctate; membrane narrow; surface with a few scattered hairs and more numerous minute stout spicules. Embolar groove long, its posterior pruinose area more than half the length of the cubital ridge. The pruinose area along the claval fold half the length of the claval suture.

The mesoepimeron narrow, the scent gland osterole laterad of its tip. The metaxyphus triangular, its tip acute angled. The front leg quite similar in the sexes, that of the male a little stouter. The femur with a stout elongate spine on its ventral margin and a number of spines, some short and some long, on the front margin, the male has two pairs of stout short spines, one pair near the base and the other near the tip on the anterior surface. The palae are much alike. There are about 7 spines in the upper palmar row and 7 to 9 in lower palmar row; the palm itself with a few stout moderately long bristles; the female claw is spine-like while that of the male is ligulate, nearly half as long and about half as wide as the pala. The middle and hind legs moderately stout. Middle leg: femur : tibia : tarsus : claw :: 100 : 54 : 40 : 22+. Hind leg: femur :

tibia : tarsus 1 : tarsus 2 :: 100 : 87 : 113 : 60—. The smooth area of hind femur both above and below with many stout spines. The last ventral abdominal segment of female as shown on Plate XV, figure *b*. The male genital capsule as in figure *d* on same plate.

Location of types: Holotype and allotype, male and female respectively, collected near St. Paul, Minn., Jan. 15, 1919, in ice by R. F. Hussey, in the collection of Museum of Zoology, University of Michigan. Paratypes: 9 males and 20 females, topotypic, Sept. 23 and Oct. 8, 1918, Nov. 17 and Nov. 24, 1919, Jan. 9 and 17, 1920. Also 5 males and 6 females, Fort Tottem Lake, N. D., Aug. 7, 1919, C. Thompson. These in collection of University of Michigan Museum of Zoology, University of Minnesota Division of Entomology, J. R. de la Torre-Bueno, University of Kansas Entomological Museum, H. M. Parshley, and R. F. Hussey.

Data on distribution: (Plate XXIII). Besides the above type series we have seen the following:

U. S. A.: *Michigan:* Cheboygan Co., Nelson L., Aug. 3, 1939, Isabella Baird (Mich.) 3 males.

Minnesota: St. Louis Co., June 6 (Hussey Coll.). 3 males, 2 females; St. Paul, Elk's Golf Ponds, June 20, 1921, 3 males, 8 females; June 27, 8 males, 11 females; July 11, 5 males, 7 females; July 14, 1 female; all the above, except the first, by H. B. Hungerford; Minnehaha Creek, Hennepin Co., July 9, 1921, H. B. Hungerford, 1 male, 6 females; St. Louis Co., Aug. 14, 1922, H. B. Hungerford, 1 male, 3 females.

South Dakota: Roslyn, Sept. 14, 1939, H. C. Severin (Severin), 1 male, 1 female; Waubay, Blue Dog Lake, Sept. 14, 1939, H. C. Severin (Severin) 1 male; also July 24, 1940, 1 male; Pickerel Lake, Sept. 14, 1939, H. C. Severin (Severin), 1 male; Oak Lake, Aug. 2, 1940, H. C. Severin (Severin), 1 female.

CANADA: *Saskatchewan:* Murray Lake, 1940, D. S. Rawson, 1 male.

Alberta: Cypress Hills, July 21, 1930, J. H. P.; S. W. Alberta, June 21, 1937, Lonesome Lake, D. S. Rawson, 2 females.

Manitoba: Shoal Lake, July 31, 1937, H. T. Peters, 3 males; Treesbank, Aug. 3, 1910, J. B. Wallis (Wallis), 1 male; Russell, Aug. 1, 1937, C. L. Johnston, 2 females.

British Columbia: Brent Lake, Summerland, Oct. 28, 29, 1931, A. N. Gartrell; Nulki Lake, near Vanderhoof, June 8, 1945, J. A. Munro, 7 females.

N. W. T.: Ft. Wrigley, Sept. 26, 1929, Owen Bryant, MacKenzie, 1929 trip, lot 14, 1 male, 1 female (Bryant).

ALASKA: Rampart, July 5, 1916, J. A. Kusche (Calif. Acad.), 1 female.

Comparative notes: Cymatia americana is most nearly related to *C. bonsdorffi* (Sahlb.), which is recorded from Europe, the Caucasus, and Siberia. From this species it may be distinguished by the following key:

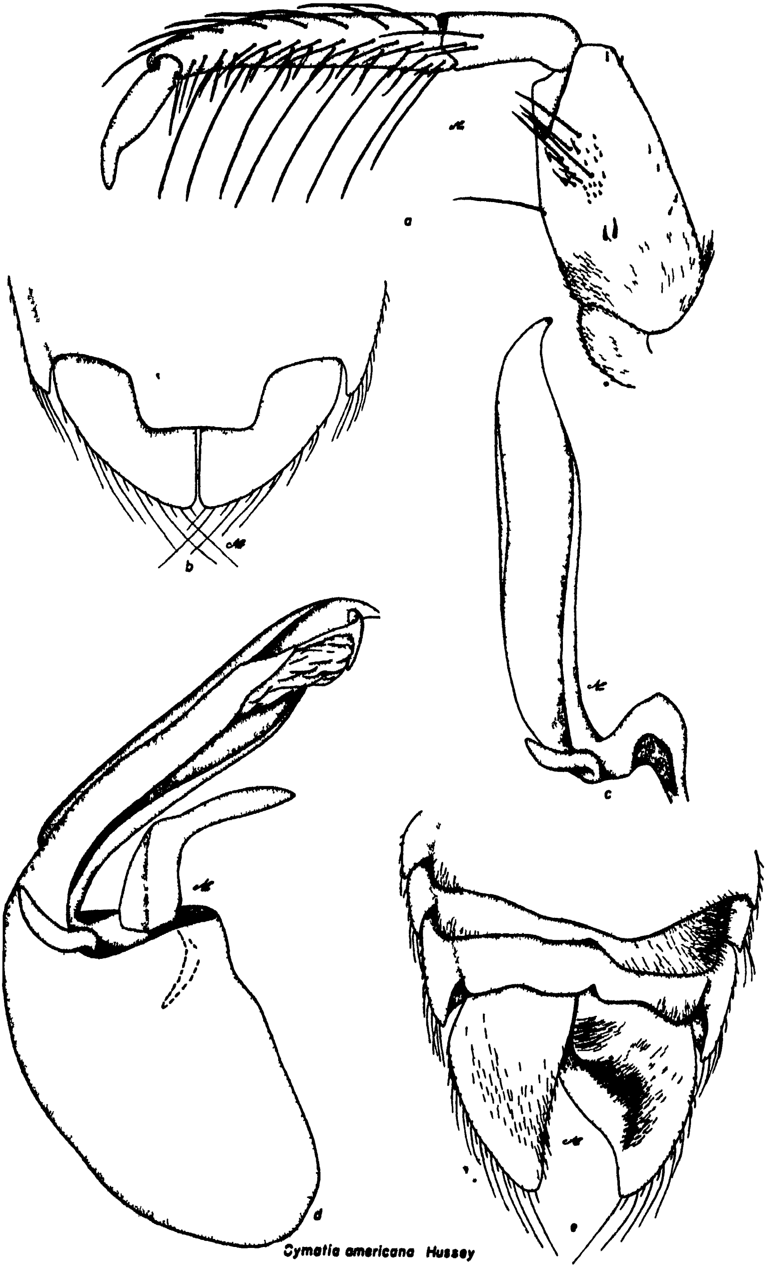
1. Size under 4.5 mm. in length . . . . *C. coleoptrata* (Fabricius)
C. jaxartensis Kirkaldy
Size larger 2
2. (1) Pronotum and hemelytra covered with fine reticulation of brown lines
C. rogenhoferi (Fieb.)
Pronotum usually without brown markings or else with faint cross bands. Hemelytral pattern with more or less definite brown bars on clavus and brown spots on corium 3
3. (2) Anterior margin of the head not produced. Corial pattern in moderately distinct longitudinal series . . . . *C. apparens* (Dist.)
Anterior margin of the head produced Corial pattern not as above. 4
4. (3) Hind margin of last ventral abdominal segment of female normal. Right clasper of male a broad plate. . . . . *C. bonsdorffi* (Sahlb.)
Hind margin of last ventral abdominal segment of female quadrately produced Right clasper of male narrow in distal half . . . . *C americana* Hussey

PLATE XV

Cymatia americana Hussey

FIG. *a*. Front leg of male.
FIG. *b*. Ventral view of tip of female abdomen.
FIG. *c*. Left clasper of male genital capsule.
FIG. *d*. Genital capsule of male.
FIG. *e*. Dorsal view of male abdomen.

PLATE XV



Cymatia americana Hussey

HETEROCORIXINAE subfamily new

Rostrum with transverse sulcations. Infraocular portion of genae very broad, lower margin of eye concave, hypo-ocular suture arising near the sub-acute production of the inferior angle of the eye. Tibia of front leg nearly as long as the pala which has a well developed palm. Scutellum covered by the pronotum. Hemelytra with embolar groove. Nodal furrow complete. Media vein indistinct, placed parallel and very near to cubitus.

This curious subfamily contains the South American genus *Heterocorixa* B. White.

Heterocorixa White

1879. White, F. Buchanan. Trans. Ento. Soc London XVII (3d Ser), pp 272-273. (*Heterocorixa* as new subg of *Corixa* Geoff.)

1928 Hungerford, H B. Bull Brooklyn Ento. Soc XXIII, No 2, pp 99-103 (*Heterocorixa* to generic rank.) Describes 4 new species and var.

1928. Lundblad, O. Entomologisk Tidskrift XLIX, Haft 2, pp 66-83 (*Heterocorixa* to generic rank) Describes 2 new species and gives notes on type *H hesperia* White

1928. Jaczewski, T. Annales Musei Zoologici Polonici VII, p 55. (Distribution.)

1935. Poisson, R Archives de Zoologie Experimentale et Générale, LXXVII, p 458 (Distribution)

Small, compact, shining bugs, having the infraocular portion of genae very broad and the hypo-ocular septum arising near the subacute production of the inferior angle of the eye. The pronotum short. The hemelytra coriaceous save the left membrane which is membranous. The pegs of the male pala confined to distal half. Strigil and asymmetry of male abdomen dextral; a prestrigil (Lundblad) more or less marked on the 5th dorsal abdominal segment, and the 4th bilobate behind.

Genotype *H. hesperia* White from Prainha, Brazil. Types in museum at Perth, Scotland.

KEY TO THE GENUS HETEROCORIXA WHITE

1. Middle leg with claws longer than tarsus; hemelytra with both slender hairs and short spines on corium; metaxyphus usually shorter than the inner line of the hind coxae; the hind femur with basal two-fifths pilose and many spines on its ventral side, male with a short prestrigilar comb and the median lobe of the seventh abdominal tergite triangular........ 2

Middle leg with claws equal to or shorter than tarsus; hemelytra lacking the short spines on corium; metaxyphus as long or longer than the inner line of the hind coxae, hind femur with little more than basal end pilose and not more than 10 or 12 spines on its ventral side; male with a long prestrigilar comb or none and the median lobe of the seventh abdominal tergite not produced into a pointed triangle.............................. 10

2. (1) Hemelytral pattern of very fine, smooth, closely crowded figures as in figure 2, text figure 2A 3

Hemelytral pattern of coarser figures as in figure 1, text figure 2A............ 6

3. (2) Metaxyphus more than half as long as inner line of hind coxae............... 4

Metaxyphus only half the length of the inner line of hind coxae or less...... 5

4. (3) Metaxyphus at least two-thirds length of inner line of hind coxae and male characters as on Plates XIX and XVI.. . ...*H. brasiliensis* Hungfd.
(See p. 107)

Metaxyphus only a little more than half the length of inner line of hind coxae and male characters as on Plate XVII.. ....*H. hintoni* n. sp.
(See p. 109)

5. (3) Metaxyphus one-half the length of inner line of hind coxae and usually blunt or rounded at tip. ... .*H. hesperia* B. White
(See p. 110)

Metaxyphus less than half the length of inner line of hind coxae and usually more pointed at tip. Male with spine on sixth segment to left of strigil.
H. hesperia venezuelana n. subsp.
(See p. 111)

6. (2) Male having an indentation on the right margin of the seventh abdominal segment . . ..*H. westermanni* Lundblad
(See p. 112)

Male without an indentation on the right margin of the seventh abdominal segment 7

7. (6) Male pala blunt at tip; metaxyphus broadly or unevenly rounded at tip. See Plate XIX, fig 5. ....*H. lundbladi* n. sp.
(See p 114)

Male pala pointed at tip; metaxyphus more pointed 8

8. (7) Median lobe of seventh segment of male very slightly produced and forming almost a straight line with right tergite. Male 6.1 mm., female 7 mm long.
H jaczewskii n. sp.
(See p. 115)

Seventh segment not as above 9

9. (8) Male without spines to left of strigil and 12 to 14 teeth in prestrigilar comb.
H wrighti n. sp.
(See p. 116)

Male with from 1 to 3 spines on sixth segment to left of strigil and with 8 or 9 teeth in prestrigilar comb ....*H. wrighti olallai* n subsp.
(See p. 118)

10. (1) Metaxyphus long but not attaining tip of hind coxal projection; male front tibia not greatly produced, strigil normal and prestrigilar comb long. 11

Metaxyphus very long, attaining tip of hind coxal projection; the male front tibia greatly produced. Strigil unique and no prestrigilar comb.
H. andvrei n sp.
(See p. 118)

11. (10) General facies not black 12

General facies black 14

12. (11) Claws of middle leg shorter than tarsus; head not broadly rounded; prestrigilar teeth of male abdomen longest on the left.. 13

Claws of middle leg longer than tarsus; head broadly rounded; color light; prestrigilar teeth of male abdomen longest on the right, *H. williamsi* Hungfd.
(See p. 120)

13. (12) The posterior pruinose area of the embolar groove a little longer than that of the claval suture; the male having the anterior tibia with a long flap resting in a depression of the pala........................*H. boliviensis* Hungfd.
(See p. 121)

The posterior pruinose area of the embolar groove considerably longer than that of the claval suture; the male tibia without a flap described above but with a carina on its caudal side......................*H. chapadiensis* Hungfd.
(See p. 123)

14. (11) Metaxyphus subequal to inner line of hind coxae; distal end of pruinose area of embolar groove truncate; male front tibia not carinate; right clasper slender, broadest at distal portion.... ....*H. woytkowskii* n. sp.
(See p. 124)

Metaxyphus longer than inner line of hind coxae; distal end of pruinose area obliquely rounded; male front tibia carinate; right clasper narrowed in distal portion........... . ...*H. nigra* Hungfd.
(See p. 126)

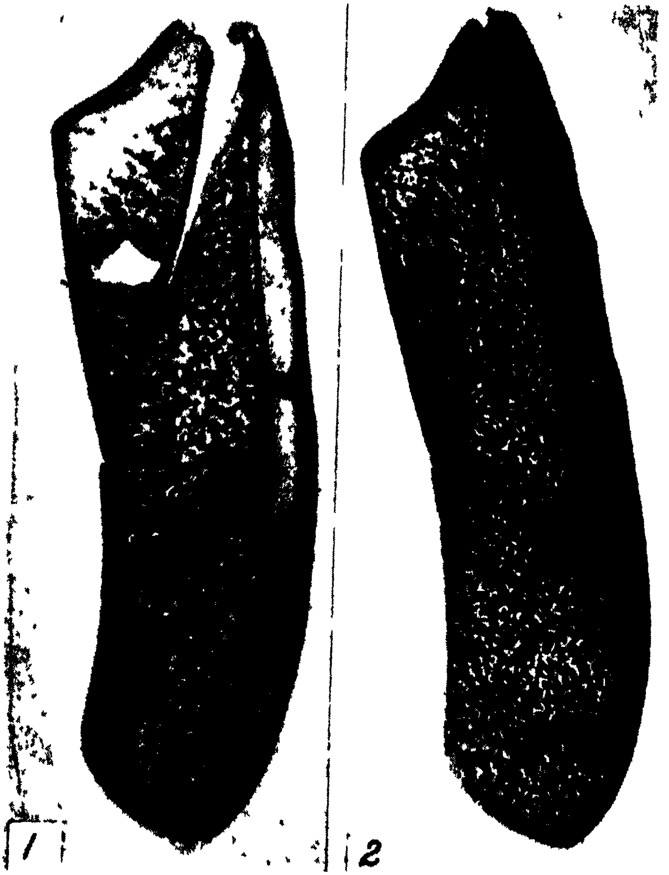


FIG 2A (1) *Heterocorixa westermanni* Lundblad, right hemelytron of female, (2) *Heterocorixa hesperia* B White, right hemelytron of female (These photograph after Lundblad, O, Ent Tidskrift, XLIX, Haft 2, 1928, pp 76 and 82)

Heterocorixa brasiliensis Hungerford

(Plate XVI, figs 4, 4a 4c)

1928 *Heterocorixa brasiliensis* Hungerford, H B Bull Brooklyn Ent Soc, XXIII, No. 2, p 101, Plate III, figures 13, 14 and 15

Size: Length 4.6 mm. to 5.56 mm , width across the head 1.43 mm. to 1.76 mm

Color: General facies dark brown, head yellowish brown with its caudal margin black; pronotum dark brown with minute irregular pale figures but faintly assembled in transverse bands; hemelytra dark brown with very slender light brown vermiculate figures; the inner basal angle of the clavus with the light bands broad and oblique; the right membrane with pattern, the left one white to transparent without pattern. Legs and venter yellow.

Structural characteristics: Head subequal in length to the moderately developed pronotal disk; anterior curve of the head as seen from above roundly acuminate; head with a faint median carina; facial impression of the male shallow; facial hairs inconspicuous, appressed; the relative lengths of antennal segments: 1 : 2 : 3 : 4 :: 18 : 12 : 22 : 15 (♀). Pronotal disk roughened, rugulose, with faint broken transverse grooves. Hemelytra smooth, shining with a few appressed slender hairs and corium with more numerous short spines; Mesoepimeron long and slender but broader than lateral lobe of prothorax, the osteole of the scent gland well before its tip with a tuft of hairs. Metaxyphus slender, pointed, longer than half the inner line of the hind coxa.

The front leg of the male without a carina on the caudal surface of the tibia, dorsal line of pala not notched; the peg row of not more than 6 pegs, four stout ones and one or two shorter basal ones; the row continued to the base by spine-like pegs; the upper palmar row of shorter spine-like pegs.

The middle leg—Femur : tibia : tarsus : claw :: 100 : 46.2 : 28.5 : 34.6; femur stout.

The hind leg—Femur: tibia : tarsus 1 : tarsus 2 :: 100 : 92 : 115 : 51; basal two-fifths of femur pilose; its upper surface without spines, its lower surface with about a dozen spines; tibia with stout spines on anterior and posterior margins and swimming hairs on posterior margin. Male abdomen as shown on plate XVI; the prestrigilar comb of about 10 teeth; the dorsal median lobe of the seventh segment elongate triangular. The claspers as shown on plate XVI.

Location of types: Described from six specimens taken by the Cornell University Expedition to Corumba, Brazil. Matto Grosso, December 14-22, 1919, Cornell Univ. Lot 569, Sub. 727. Holotype and allotype in collection of Cornell University. Paratypes in Francis Huntington Snow Collection, University of Kansas.

Comparative notes: This species in color pattern is very near to *H. hesperia* White, from which it differs in having a longer metaxyphus and shorter head.

Data on distribution: (Plate XX) Known only by the type series.

Heterocorixa hintoni n. sp.

(Plate XVII, figs. 2, 2a-2c)

Size: Length 4.6 mm. to 5 mm.; width across head 1.54 mm. to 1.68 mm.

Color: General facies dark; head brownish yellow with its caudal margin black; pronotum dark brown with faint minute irregular pale figures not assembled in transverse bands; hemelytra dark brown with small light brown vermiculate figures and dots; the inner basal angle of the clavus with the light areas larger; the right membrane with pattern continuous with corium; the left membrane white to transparent without pattern. Legs and venter yellow.

Structural characteristics: Head subequal in length to moderately developed pronotal disk; anterior curve of the head medianly prominent, the margins of the eyes obliquely receding as if shrunken anteriorly; facial impression of the male strong with appressed facial hairs; the relative length of the antennal segments: 1 : 2 : 3 : 4 :: 17 : 11 : 27 : 16 ♀. Pronotal disk roughened, rugulose with faint broken transverse grooves. Hemelytra smooth, shining with slender appressed hairs and corium with numerous short spines. Mesoepimeron long and slender but broader than lateral lobe of the prothorax, the osteole of the scent gland well before its tip with a tuft of hairs. The metaxyphus short, about half the length of the inner line of the hind coxa. The front leg of the male without a carina on the caudal surface of the tibia; dorsal line of pala not notched; the peg row of about six pegs in a curved row which is continued to the base by spine-like pegs; the upper palmar row of shorter spine-like pegs.

The middle leg—Femur : tibia : tarsus : claws :: 100 : 49.6 : 30 : 38.

The hind leg—Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 85.8 : 114.4 : 57.2; basal two-fifths of femur pilose; its upper surface without spines, its lower surface with about a dozen spines; tibia with stout spines on anterior and posterior margins and swimming hairs on posterior margin. Male abdomen as shown on Plate XVII; the prestrigilar comb of about 12 teeth; the dorsal median lobe of the seventh segment elongate, triangular. The claspers as shown on plate XVII.

Comparative notes: In the key this species runs out with *H. braziliensis* Hungerford from which it differs by its shorter metaxyphus and the characters figured on Plates XVI and XVII.

Location of types: Described from 8 males and 18 females labeled "Bolivia, S. A., Santa Ana, Aug. 14, 1937, H. E. Hinton." Holotype, allotype and some paratypes in Francis Huntington Snow Entomological Museum. Some paratypes also in the British Museum.

Data on distribution: (Plate XX) Besides the types we have the following: "Bolivia, S. A., Trinidad, VII, 25, 1937, H. E. Hinton 3 females; Bolivia, S. A. Trinidad, VIII, 9, 1937, at light. H. E. Hinton 3 males, 2 females."

Heterocorixa hesperia White

(Plate XIX, fig 6)

1879. ***Corixa Heterocorixa hesperia*** **White, F. Buchanan. Trans Ento. Soc. London, XVII (3d. ser.), p. 273.**

1928. ***Heterocorixa hesperia,*** **Hungerford, H. B Bull. Brooklyn Ent. Soc , XXIII, No. 2, pp. 99 and 101.**

1928. ***Heterocorixa hesperia,*** **Lundblad, O. Entomologisk Tidskrift, XLIX, pp. 81-83, figs. 13-15. (Examined types)**

White described this new species from five females as follows: "Nigro-fusca, subnitida, punctis et signaturis vermiculatis pallido-testaceis dense notata; pronoto lineis transversis 5 angustissimis fusco-nigris; clavo ad angulum interiorem subtestaceo lineolis irregularibus obliquis fusco-nigris notato; embolio et area marginali corii opacis innotatis; membrana dextra corio concolori, margine apicali subinnotato; membrana sinistra pallide fusca innotata, margine antico fusco-brunneo, linea suturae anguste fusco-brunnea; abdomine dorso sordide testaceo fusco-nebuloso; pectore pallido-testaceo; ventre sordide testaceo, segmentis 4°, 5°, 6°que ad angulos posticos fusco-maculatis. Tarsis anticis tibiis anticis haud duplo longioribus, cultratis, acutis; tarsis intermediis unguiculis sublongioribus; tarsis posticis fusco-pilosis.

♀ Long. 5½ mm., lat. 2 mm.

Hab.—Prainha (November, 1873). Five specimens."

In 1928 Lundblad received two of the type series for study through the kindness of Mr. China of the British Museum, and in the spring of the same year Hungerford visited the Perth Museum in Scotland where he examined the three types remaining there. From these reëxaminations it is evident that Hungerford's *H. chapadiensis* is not a variety of White's species which in color pattern is very close to *H. braziliensis* Hungerford. A comparison of type females of *H. hesperia* White and *H. braziliensis* Hungerford side by side shows *H. hesperia* with a shorter metaxyphus and the following head measurements: for *H. hesperia,* synthlipsis 2.6; vertex 4—;

length head 4—; width head 9⅔; for *H. boliviensis,* synthlipsis 2.6+; vertex 3.8; length head 3.6; width head 9⅔. The metaxyphus of *H. hesperia* White is slender, bluntly rounded at tip and only half the length of the hind coxae measured on its inside line. Doctor Lundblad gives a photograph of the hemelytra and drawings of the metaxyphus, lateral pronotal lobe, pronotum and pala. He calls attention to the secondary row of thorn-shaped, short bristles. Yet we find these present on the females of all *Heterocorixa* species. Since we have no series of females just like the types accompanied by males, we refrain from redescribing the species. In color pattern both *H. boliviensis* Hungerford and *H. hesperia hintoni* agree with *H. hesperia* White, but the former, which Hungerford compared with White's types, has a longer metaxyphus and a shorter head while the latter, with its metaxyphus like that of *H. hesperia,* has a head of different shape. Furthermore, the color pattern of *H. westermanni* Lundblad appears distinct, but there is a series labeled "Brazil, S. A., 7-10, 9-20, A. M. Olalla, Vic João Passoa (São Philipe) River Jurua" and some others with a pattern that is intermediate. Thus the entire *H. hesperia* complex is a difficult one, comprising a number of closely related forms.

Heterocorixa hesperia venezuelana n. subsp.

(Plate XVII, figs 1, 1a-1c)

Size: Length 5 mm.; width across head 1.64 mm. to 1.68 mm.

Color: General facies medium brown. The pattern of the pronotal disk and hemelytra as shown in Doctor Lundblad's figures of *H. hesperia.* The hemelytral pattern of very fine, smooth, closely crowded figures.

Structural characteristics: Head subequal in length to the moderately developed pronotal disk; facial impression of the male rather broadly oval with a few appressed facial hairs; the relative length of the antennal segments: 1 : 2 : 3 : 4 :: 20 : 12 : 33 : 12 ♀. Pronotal disk roughened, rugulose. Hemelytra smooth, shining, with slender appressed hairs and corium with numerous short spines. Mesoepimeron long and slender but broader than the lateral lobe of the prothorax, the osteole of the scent gland well before its tip, with a tuft of hairs. Metaxyphus short, usually less than half the length of the inner line of hind coxae, rather pointed at its tip. The front leg of the male without a carina on the caudal surface of the tibia; dorsal line of pala depressed on distal fourth; five pegs, the distal three of which are large; spine-like pegs continue the row to the base of the palm; a row of short pegs along the upper margin of the palm. Middle leg: femur : tibia : tarsus : claw :: 100 : 52.3 : 29.2 : 37.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 79.9 : 110 : 50. The basal two-fifths of femur pilose; its upper surface without spines, its lower surface with a dozen or more spines. Male abdomen as shown on Plate XVII; the prestrigilar comb of about 8 spines, the strigil of 5 combs to the left of which there is a single spine; the dorsal median lobe elongate. The claspers as shown on Plate XVII.

Comparative notes: Since the male of *H. hesperia* White is unknown at present, it seems best to report this little series as a subspecies.

Location of types: Described from male holotype, allotype and five paratypes, all females, labeled "Venezuela, S. A., St. Domingo, Berinas, Jan., 1943, P. Anduze." Types in the Francis Huntington Snow Entomological Collections, University of Kansas, and two paratypes sent to Doctor Anduze for the Venezuelan collection.

Data on distribution: (Plate XX) Known only by the type series.

Heterocorixa westermanni Lundblad

(Plate XVI, figs. 1, 1a-1c)

1928. *Heterocorixa westermanni* Lundblad, O. Entomologisk Tidskrift, Vol. 49, Haft 2, pp. 76-81, figs. 8-12.

Although we have 134 specimens from various places in Brazil that belong very near to *H. westermanni,* we have none that fits precisely. Doctor Lundblad's excellent German description of this species. We therefore present a rewrite of his description. In this same paper Doctor Lundblad first described *H. reinhardti* and then in describing *H. westermanni* compared it with his *H. reinhardti* which is a synonym of *H. nigra* Hungerford.

Size: Unfortunately Doctor Lundblad does not mention the size.

Color: The color is decidedly lighter than in *H. reinhardti.* The pronotum has more extended lighter figures which are richly branched, irregular and partly run together. These are arranged in four or five cross bands. The hemelytra, while having the left membrane almost clear as in the preceding species, are strongly different in other respects, insofar as the lighter figures are much more richly developed; especially the base of the clavus is lighter; elsewhere the dark and light figures occupy an equal amount of space; they are very irregular and partly lost in fine dots as if sprinkled; on the outer end of the marginal area there is a very plain dark spot and a second longer one on the outer margin of the membrane near its apex.

Structural characteristics: Pronotum weakly wrinkled. Hemelytra entirely smooth and shining. Head of male with the frontal depression not very deep but plainly extended between the eyes and covered with long hairs. The antennae in the type were deformed and so not measured. The thorax with a shorter pronotal disk than in *H. reinhardti,* and the metaxyphus has a different outline with more parallel sides. The corium of the hemelytra has, besides the fine hairs, thorns which are pointed toward the rear. These are entirely lacking in *H. reinhardti.**

In the front leg of the male the femur lacks the outer hair brush figured for *H. reinhardti;* the tibia with its distal point extended above; the pala is small but in proportion to the tibia somewhat larger than in *H. reinhardti;* the pala is not plainly contracted but abruptly narrowed beyond the last upper edge hair; the strigilar thorn row is also less strongly bent; as in *H. reinhardti* the basal strigil thorns are bristle-shaped (some 11 of them), then follows the curved row of 7 thorns of more normal structure and finally 2 bristle-shaped thorns. The inner bristles of the pala under edge, which are not shown in the drawing, are about 13. Those at the end of the row are not so strongly lengthened as in *H. reinhardti;* also not shown in the drawing are some 16 bristles, and the upper edge hairs 8 long ones and one very short one basally present Both middle legs are gone in the type. Hind legs have the femur without thorns dorsally and with about 22 thorns in 2 rows of which one row only contains 4 or 5 standing singly and the others are formed in groups of several.

The fourth abdominal segment is after the same plan as in *H. reinhardti* but the hind margin hairs of the tergite are more numerous and longer and the right lobe or tongue less protruding and the side edge with 4 instead of 3 thorns. The fifth abdominal segment also reminds one of *H. reinhardti;* namely, the tergite has a praestrigil but the comb has only 11 teeth which are clearly separated by small spaces. The comb is much less pronounced. The sixth abdominal segment has a strigil of more common appearance, not as strongly lengthened. It is composed of two regular and several irregular shorter comb thorn rows. Left of the strigil is also a row of long hairs. In the seventh abdominal segment the median tongue

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* Doctor Lundblad calls attention to the value of this character in separating species in this genus as he had used it in the genus *Trichocorixa*

of the hind margin is large, triangularly pointed and has numerous and long hairs on its edge. The lateral margin of the right side shows an indentation, an incurve margin, and before it a corner with a bristle; both lateral margins carry fairly thick hairs. The ninth abdominal segment or genital capsule as in *H. reinhardti;* the right genital clasper of very peculiar shape. It gets smaller very abruptly to a very plain point. The left clasper, while different in several respects, corresponds to that of *H. reinhardti.* It lacks hooks and is entirely smooth. See Plate XVI for reproduction of Lundblad's drawings.

Location of types: A male and female from Brazil in the Zoologischen Museum in Kopenhagen where they belong to the large insect collection presented by B. W. Westermann.

Comparative notes: While we have not seen this species, the males should be recognized by the indentation of the right margin of the seventh abdominal segment. None of the series before us has this indentation. This is a character which in other genera of Corixidae has proved of specific value. Its closest relatives are *H. hesperia* and *H. brasiliensis* which also have the short spines on the hemelytra, the hind femur with the basal two-fifths pilose and numerous spines on its ventral side, and a metaxyphus shorter than the inner line of the hind coxae.

Data on distribution: See Plate XX.

Heterocorixa lundbladi n. sp.

(Plate XVI, figs. 2, 2a-2c)

Size: Length 5.33 mm. to 5.88 mm.; width across the head 1.8 mm. to 1.89 mm.

Color: General facies medium to light; head yellow, its caudal margin with a narrow brown line; pronotum with three or four indefinite brown bands; hemelytra brown with small yellow vermiculate figures; inner basal angle of the clavus with lighter areas larger; the right membrane with pattern continuous with corium; the left membrane white to transparent without pattern. Legs and venter yellow.

Structural characteristics: Head longer than the short pronotal disk; facial impression of male elongate oval with some appressed facial hairs; the relative length of the antennal segments: 1 : 2 : 3 : 4 :: 19 : 14 : 29 : 19 ♂ ; 1 : 2 : 3 : 4 :: 20 : 16 : 30 : 20 ♀. Pronotal disk roughened, rugulose. Hemelytra smooth, shining, with slender appressed hairs and corium with numerous short spines.

Mesoepimeron long and slender but broader than lateral lobe of the prothorax, the osteole of the scent gland well before its tip with a tuft of hairs. The metaxyphus variable but usually broadly or unevenly rounded at tip. The front leg of the male without a carina on the caudal surface of the tibia; dorsal line of pala not notched; tip of pala blunt, the row of about seven pegs continued to the base by spine-like pegs; the upper palmar row contains about eight elongated pegs.

The middle leg: femur : tibia : tarsus : claws :: 100 : 45.1 : 25.1 : 31.7.

The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 85.3 : 108.8 : 55.9. Basal two-fifths of femur pilose; its upper surface without spines, its lower surface with a dozen or more spines. Male abdomen as shown on Plate XVI; the prestrigilar comb of about 9 teeth; the dorsal median lobe of the seventh segment triangular. The claspers as shown on Plate XVI.

Comparative notes: This species is close to *H. westermanni* Lundblad from which it differs in not having an indentation on the right margin of the seventh abdominal segment in the male.

Location of types: Described from 15 males and 26 females labeled "Manacapura, Brazil, Manãos, Amazon, March, 1928, S. M. Klages." Holotype, allotype and paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XX) Known only from the type series from Brazil.

Heterocorixa jaczewskii n. sp.

(Plate XVI, figs. 8, 8a-8c)

Size: Length 6.1 mm. to 7 mm.; width across the head 1.76 mm. to 1.8 mm.

Color: General facies medium; head yellow, caudal edge black; pronotum yellowish crossed by four brown bands and flecks of brown in the pale interspaces; hemelytra with coarse vermiculate figures, the pale ones on the whole larger than the brown, although in the male the dark bands are more or less run together on the distal corial area; the right membrane with pattern continuous with that of corium; the left membrane white to transparent without pattern. Venter grayish to brown; legs yellow.

Structural characteristics: Head longer than the reduced pronotal disk; facial impression of the male obovate, rather pointed above with some appressed facial hairs; the relative length of antennal segments: 1 : 2 : 3 : 4 :: 19 : 17 : 38 : 18 ♀. Pronotal disk rugulose. Hemelytra smooth, shining, with slender appressed hairs and corium with numerous short spines. Mesoepimeron long and slender but broader than lateral lobe of the prothorax, the osteole of the scent gland well before its tip with a tuft of hairs. The metaxyphus parallel-sided, blunt at tip which attains the end of inner line of hind coxa. The front leg of male without a carina on the caudal surface of the tibia; dorsal line of pala not notched; the peg row consisting of 9 pegs, the distal 6 long and sharp; spine-like pegs continue the peg row to base of palm; an upper palmar row of slender spine-like pegs.

Middle leg: femur : tibia : tarsus : claws :: 100 : 42.9 : 27 : 33.4.

Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 75.1 : 108.4 : 47.3. Basal two-fifths of femur pilose; its upper surface without spines, its lower surface with a dozen or more spines. Male abdomen as shown on Plate XVI; the prestrigilar comb of about 12 spines; strigil of five combs; median lobe of seventh abdominal segment of male very slightly produced and forming almost a straight line with right tergite. The claspers as shown on Plate XVI.

Comparative notes: In this species the male pala is more pointed than in *H. lundbladi* n. sp. and the median lobe of the seventh abdominal segment is much less developed than in *H. wrighti* Hungerford.

Location of types: Holotype male and allotype female, labeled "Brazil, S. A., Pernambuco, XII, 1931, via Jaczewski." These are in the Francis Huntington Snow Entomological Collections, University of Kansas. The specimens were sent to us by Doctor Jaczewski labeled *Heterocorixa westermanni* Lundb. Since they are not that species, we have named the species in his honor.

Data on distribution: (Plate XX) Known to us only by the types but additional specimens should be in the National Museum at Warsaw, Poland.

Brazil: Bello Horizonte, April, 1935, D. M. Cochran (U. S. N. M. Coll.), 1 female (compared with types).

Heterocorixa wrighti n. sp.

(Plate XVII, figs 4, 4a-4c)

Size: Length 6 mm. to 6.8 mm.; width across head 1.78 mm. to 2 mm.

Color: General facies medium; head yellow, caudal edge black, pronotum yellowish crossed by four or five brown bands and flecks of brown in the pale interspaces; hemelytra with moderately coarse vermiculate figures, the pale ones on the whole slightly larger than the brown and decidedly larger at the inner basal angle of the clavus; the right membrane with pattern continuous with that of corium; the left membrane white to transparent without pattern. Legs yellow, venter gray to yellow.

Structural characteristics: Head subequal in length to moderately developed pronotal disk; facial impression of the male obovate, rather pointed above with some appressed facial hairs; the relative length of antennal segments: 1 : 2 : 3 : 4 :: 20 : 14 : 38 : 18 ♀. Pronotal disk rugulose. Hemelytra smooth, shining, with slender appressed hairs and corium with numerous short spines. Mesoepimeron long and slender but broader than the lateral lobe of the prothorax, the osteole of the scent gland well before its tip with a tuft of hairs. The metaxyphus rather slender, nearly parallel-sided, blunt at tip which does not quite attain the end of the inner line of hind coxa. The front leg of male without a carina on the caudal surface of the tibia; dorsal line of pala not notched; the peg row consisting of eight pegs, the distal two of which are slender; spine-like pegs continue the row to base of palm; an upper palmar row of short slender spine-like pegs.

Middle leg: femur : tibia : tarsus : claws :: 100 : 48.1 : 27. 8 : 38.9.

Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.8 : 114.2 : 42.8. Basal two-fifths of femur pilose, its upper surface without spines, its lower surface with a dozen or more spines. Male abdomen as shown on Plate XVII; the prestrigilar comb of about 12 spines; strigil of 5 or 6 combs; median lobe of seventh abdominal segment of male elongate, triangular. The claspers as shown on Plate XVII.

Comparative notes: This species belongs to the *H. hesperia* group and is separated from *H. jaczewskii* Hungerford by its more developed median lobe of the seventh abdominal segment.

Location of types: Holotype, allotype and 34 paratypes (17 males, 17 females) labeled "Brazil, S. America, No. 11395, Stillman Wright." These are in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XX) Besides the above we have the following: "Brazil, S. America, No. III, Stillman Wright, Areia, Parahyba, Lat. 7, Long. 36," 3 males, 7 females; "Brazil, S. America, No. 5530, Perhyba, Souza, Lat. 7, Long. 38," 3 females; "Brazil, S.

A., Nov. 4, 1937, S. Wright, Bon Acude Maranguape, Ceara," 1 male.

Heterocorixa wrighti olallai n. subsp.

(Plate XVII, figs. 8, 8a-8c)

Size: Length 5.8 mm. to 6.5 mm.; width across head 1.68 mm.

Color: Same as for *H. wrighti.*

Structural characteristics: The females not distinguishable from *H. wrighti.* The antennal segments: 1 : 2 : 3 : 4 :: 18 : 16 : 35 : 15 ♀.

Middle leg: femur : tibia : tarsus : claws :: 100 : 49 : 28 : 35.

Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 85.8 : 108.7 : 45.8. The male pala, claspers and abdominal dorsum as shown on Plate XVII. One to three little spines to the left of the strigil are not present in *H. wrighti* and the basal lobes of the eighth abdominal segment are slightly different in shape.

Location of types: Holotype and two male paratypes labeled "Brazil, S. A., 7-10-9-20, 1936, A. M. Olalla, vic. of João Pessoa (São Philipe) River Jurua, No. 379." In Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XX) We have also 7 males, 2 females labeled "Brazil, S. A., Sept., 1935, A. M. Olalla, Río Purus, Castanha Region."

Heterocorixa anduzei n. sp.

(Plate XIX, figs. 8, 8a-8f)

Size: Length 4.83 mm.; width across head 1.47 mm.

Color: Anterior half to tip of clavus pale, mottled with brown, posterior half black. Head with a dark spot on the front of the vertex and the posterior margin of head black; pronotum with very small brown spots, close together on a lighter background and without design, along anterior margin the figures are effaced; caudal margin black; clavus and basal two-thirds of corium with more or less reticulate brown figures, figures on inner basal angle of clavus effaced; remainder of corium and membrane black on both hemelytra; the embolar groove frosty black. Face, thoracic venter and legs pale; abdomen dark.

Structural characteristics: Head rather long, subequal to the rather well developed pronotal disk; interocular space narrow, about half the width of an eye with a median longitudinal ridge between the inner angles of the eyes; anterior margin of the head steeply curving from the median line; facial impression of the male deep, extending halfway up between the eyes, facial hairs moderately abundant, appressed; the lower margin of the subocular area medianly produced, a characteristic feature of this species; the third antennal segment produced beyond the base of the fourth; their relative over-all lengths being 22:15. Pronotal disk moderately roughened with about 10 transverse grooves, making the surface appear corrugated in certain lighting. Hemelytra smooth, shining with numerous appressed hairs, mostly dark. Mesoepimeron slender, the osteole of scent gland well before its tip and with a tuft of long hairs. Metaxyphus very long, very slender, pointed and attaining the tip of the coxal projection. The front leg of the male unique (see Plate XIX); the tibia greatly produced over the basal half of the pala, with two tiny combs subapically and three pegs and four spines at its junction with the pala, its greatest diameter about half way between the pala and its base; the pala itself slender, elongate, with five large pegs at distal end of a row of twelve spine-like pegs, the length of which decrease toward the base; the upper palmar row consisting of elongate spine-like pegs.

The middle leg—Femur : tibia : tarsus : claws :: 100 : 44.8 : 33.6 : 20.2; femur rather slender with weak spines and a short thick set row of about 25 swimming hairs on its median ventral section.

The hind leg—Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 95.8 : 114.4 : 57.2; only the extreme base of femur pilose and without discernible spines either above or below; spines on tibia and tarsus moderately stout; a few swimming hairs on rear margin of femur near tip and on posterior margin of tarsus. Male abdomen as shown on Plate XIX; the usual strigil replaced by a comb of caudally directed teeth. Genital claspers as shown on Plate XIX.

Location of type: Described from a single male specimen labeled "Venezuela, S. A. Surukum, June, 1941, P. J. Anduze." Type in Francis Huntington Snow Collections, University of Kansas. (See Plate XX.)

Comparative notes: The exceedingly slender and elongate metaxyphus, the remarkable prolongation of the male tibia and the median production of the lower margin of the subocular area identify this remarkable species. Its general color pattern is nearest that of *H. boliviensis* from which it is structurally very distinct.

Heterocorixa williamsi Hungerford

(Plate XVIII, figs. 4, 4a-4c)

1928. *Heterocorixa williamsi* Hungerford, H. B. Bull. Brooklyn Ent. Soc. XXIII, No. 2, pp. 99-100, Plate III, figs. 10, 11 and 12.

Size: Length 4.2 mm. to 4.6 mm.; width across the head 1.35 mm. to 1.47.

Color: Rather pale; the dark color reddish brown to brown and the light color pale lemon yellow. Caudal margin of head black; pronotum pale, with four or five reddish brown curved bands, the median of which is broader than the others; the hemelytra mottled with the light and dark figures about evenly divided; the pattern in oblique series on clavus and more or less longitudinal on corium; a submarginal dark stripe extends from tip of right clavus, diverging somewhat from the margin until it vanishes in the field of the membrane; the reticulate pattern continued on the right membrane; the left membrane smoky brown without pattern; embolar groove pale to frosty black; legs and venter yellow.

Structural characteristics: Head longer than the very short pronotal disk, which it embraces; anterior curve of the head as seen from above broadly rounded; head without median longitudinal carina; inner margin of the eyes as seen in cephalic view plainly divergent; facial depression of the male very slight; facial hairs few, appressed; the relative length of the antennal segments are as follows: 1 : 2 : 3 : 4 :: 15 : 12 : 20 : 10. Pronotal disk lightly rugulose. Hemelytra smooth, shining with a few appressed hairs. Mesoepimeron slender, the osteole of the scent gland well before its tip with a tuft of hairs. Metaxyphus long, slender, acuminate, surpassing the inner distal margin of the coxae. The front leg of the male appears to have no pad at end of tibia; the pala with a dorsal carina at its base. There are 13 stout pegs preceded by about 9 spine-like pegs; the upper palmar row of spine-like pegs longest distally.

The middle leg— Femur : tibia : tarsus : claws :: 100 : 49.2 : 28.7 : 32.8; moderately stout with weak spines.

Hind leg—Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 96.6 : 104.6 : 61.2; moderately stout; only the base of hind femur pilose, its surface without discernible spines; tibia with moderate spines. Male abdomen and genital claspers as shown on plate XVIII.

Location of types: Described from 26 specimens (7 males, 19 females) taken at Tena, Ecuador, February 23, 1923, by Doctor F. X.

Williams. Holotype, allotype and paratypes in Francis Huntington Snow Entomological Collections, University of Kansas. (See Plate XX).

Comparative notes: This pale species, with its broadly rounded head and short pronotal disk, is very easily identified, and yet certain details of its structure are very close to *H. woytkowskii* which is a black species with well developed pronotal disk. Its metaxyphus is narrower and more sharply pointed, and the spiny armature of the middle and hind legs less developed than in *H. woytkowskii.* The prestrigilar teeth are longest to the right of the strigil in *H. williamsi* which is not true for *H. woytkowskii.*

Heterocorixa boliviensis Hungerford

(Plate XVIII, figs 5, 5a-5c)

1928. *Heterocorixa boliviensis* Hungerford, H. B. Bull Brooklyn Ent. Soc, XXIII, No. 2, pp. 100-101, Plate III, figs 5, 6 and 7. (Fig. 4 = *H. nigra*)

Size: Length 4.2 mm. to 5.25 mm.; width across head 1.47 mm. to 1.64 mm.

Color: General color effect dark, the pattern in some series mottled throughout, in others distal third of corium and membranes black. Head white to yellowish with postocular area more deeply pigmented, its rear margin brown to black; pronotum crossed by 5 to 10 brown ragged-edged bands that anastomose here and there; the clavus with similar brown figures arranged obliquely with the figures usually effaced from inner basal angle. Hemelytra, including the membrane, may be mottled throughout with crowded figures or beyond the tip of the clavus may be suffused with black and pattern entirely obscured; left membrane may be white, transparent or black but lacks the pattern that may be present on the right membrane; the embolar groove frosty black. Thoracic venter and legs white to yellow. Abdominal venter a little darker in the females and may be nearly black in some males.

Structural characteristics: Head not longer than the pronotal disk; anterior curve of the head as seen from above shows the vertex advanced beyond the curve of the eye; facial impression of the male moderately extending above the inferior angle of the eyes; facial hairs scattered, appressed; the relative lengths of the antennal segments are as follows: 1 : 2 : 3 : 4 :: 18 : 10 : 20 : 18. Pronotal disk roughened, sometimes with transverse grooves associated with the brown bands. Hemelytra smooth, shining with appressed slender hairs. Mesoepimeron slender, the osteole of the scent gland well before the tip and with a tuft of hairs. Metaxyphus slender elongate, its tip attaining distal inner margin of the hind coxae. The front leg of the male with a large tibial pad that lies in a depression on the front of the pala with 6 to 8 pegs in a broken row, having 4 or 5 pegs beyond the break and 2 or 3 smaller pegs before it, the row continued by elongate spine-like pegs to the base; the upper palmar row of spine-like pegs longest apically.

The middle leg—Femur : tibia : tarsus : claws :: 100 : 48 : 28 : 26.4; femur with moderate spines and a row of weak swimming hairs on its dorso-caudal margin more noticeable in the males.

The hind leg—Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 93 : 114 : 57; moderately stout; only the base of the femur pilose, its upper surface without spines, its lower surface with 5 or 6 weak spines faintly discernible; tibia with stout spines on anterior and posterior margins and a few swimming hairs; the tarsus with spines on anterior margin and swimming hairs on posterior margin. Male abdomen as shown on Plate XVIII. The prestrigilar teeth to the left of the median line of the strigil long and somewhat turned ventrally, those to the right shorter and continued to the right margin; the strigil roughly triangular, its inner margin curved. The dorsal lobe of the left half of the eighth abdominal segment pointed, its surface covered with stout semiappressed spines. Genital claspers as shown on Plate XVIII.

Comparative notes: While this species agrees with *H. woytkowskii* in having a pad on the end of the male tibia, its right clasper is more like that of *H. chapadiensis*. In the type series and those from Brazil there is only a faint suggestion of black on the distal third of the hemelytra. Most of the others have a moderate to distinct black band.

Location of types: Described from 5 male and 13 female specimens bearing the label "Buenavista, Bolivia, Dept. Santa Cruz, S. A., Sept. 21, 1923, R. T. Steinback." Holotype, allotype and paratypes in Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XX) Besides the type series we have the following:

Bolivia: "R. Bení, Puerto Salinas, Nov., 1937, A. M. Olalla." 1 male, 5 females. "R. Bení, Victoria, Oct., 1937, Junction of Madre de Dios and Bení Rivers." 2 males, 2 females.

Ecuador: "Oriente. E. Río Napo watershed. Jatun Yacu 700 meters, Mar. 28, 1937, Clarke MacIntyre." 2 males.

Brazil: "Vic. João Pessoa (São Philipe) River Jurua, July 10 to Sept. 20, 1936, A. M. Olalla." 13 males, 25 females; Utinga Belem, Para, Aug. 1946, L. and M. Deane.

Perú: "Dept. Huanuco. Vic. Leonpampa, Jungle 800 m. a. s. 1. Forest Pools, Dec. 12-14, 1937. F. Woytkowski No. 385." 31 males, 65 females; "Dept. Huanuco, Vic. Leonpampa, Jungle 800 m. a. s. 1. Dec. 11-30, 1937, F. Woytkowski No. 3811." 23 females; "Dept. Huanuco, Loc. Shapajilla. Jungle 630 m. a. s. 1. Aug. 2, 1938, F. Woytkowski, No. 3848." 4 males, 32 females; "Dept. Huanuco, Loc. Shapajilla. Jungle 630 m. a. s. 1. Aug. 1, 1938, F. Woytkowski, No. 3850." 6 males, 10 females.

Heterocorixa chapadiensis Hungerford

(Plate XVIII, figs. 2, 2a-2c)

1928. *Heterocorixa hesperia* var. *chapadiensis* Hungerford, H. B. Bull. Brooklyn Ent. Soc., XXIII, No. 2, p. 102, Pl. III, figs 1, 2 and 3

Size: Length 4.2 mm. to 5.25 mm.; width across the head 1.47 mm. to 1.6 mm.

Color: General facies dark brown, the holotype with a black band across the middle of the hemelytra. Head yellowish brown with its caudal margin black. Pronotum may be brown with pale figures obscured or with 7 or 8 transverse ragged bands of lighter brown; the hemelytra mottled with rather coarse figures; the right membrane with the same pattern, the left membrane white to transparent without pattern. Legs and thoracic venter yellow to brown, abdominal venter darker in the male.

Structural characteristics: Head nearly as long as the well developed pronotal disk; anterior margin of the head rather steeply curving from the median line; facial impression of the male not well defined; facial hairs inconspicuous, appressed; the relative lengths of antennal segments: 1 : 2 : 3 : 4 :: 17 : 12 : 22 : 10 ♀. Pronotal disk roughened, rugulose and with transverse grooves; the grooves following the deeper pigmentation. Hemelytra smooth, shining, with a few appressed hairs. Mesoepimeron slender, the osteole of the scent gland well before its tip with a tuft of hairs. Metaxyphus long and slender, its acuminate tip attaining the distal inner margin of the hind coxae. The front leg of the male with a longitudinal carina on the caudal surface of its tibia. The pala is notched above and distal end twisted; the peg row with 11 pegs in an inverted V, the distal portion with 7 pegs, 5 of which are stout, and basal portion of 4 smaller pegs; the row continued to the base by 9 spine-like pegs; the upper palmar row of elongate spine-like pegs.

The middle leg— Femur : tibia : tarsus : claws :: 100 : 43.3 : 32 : 22; femur moderately stout, elongate with moderately long spines.

The hind leg— Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100 : 122.4 : 63.2; only the base of femur pilose, its upper surface without spines, its lower surface with about 7 inconspicuous spines; tibia with stout spines on anterior and posterior margins and swimming hairs on posterior margin. Male abdomen as shown on plate XVIII. Prestrigilar comb long, of many teeth; a secondary comb or row of spines to left of strigil. Claspers as shown on plate XVIII.

Comparative notes: This was described as a variety of *H. hesperia* White but differs from that species in its coarser color pattern, longer metaxyphus, much longer prestrigilar comb and more palar pegs in the male.

Location of type: The holotype, from Chapada, Brazil, in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XX) In addition, we have 2 females from Para, Brazil.

Heterocorixa woytkowskii n. sp.

(Plate XVIII, figs. 1, 1a-1c)

Size: Length 4.2 mm. to 4.8 mm.; width across head 1.47 mm. to 1.7 mm.

Color: Very dark brown to black, the pronotum and hemelytra entirely lacking the pale spots described for *H. nigra,* the membrane of the left hemelytron pigmented like the right. Head with the postocular area and face including the subocular area dark brown to black; the vertex and so-called beak white. The embolar groove frosty black. Legs brown to black, including anterior femora. Thorax and abdominal venter brown to black.

Structural characteristics: Head no longer than pronotal disk. Anterior margin of head less prominent that in *H. nigra*; postocular area broad, its surface along caudal margin wrinkled or coarsely rastrate; head with faint median carina; facial impression of male shallow and transverse; facial hairs few, appressed; the relative lengths of the finely haired antennal segments are as follows: 1 : 2 : 3 : 4 :: 17 : 14 : 20 : 12. Pronotal disk roughened, rastrate and transversely grooved; the grooves broken and about seven of them. Hemelytra smooth shining with a few appressed slender white hairs and more numerous stouter black hairs. Mesoepimeron slender, the osteole of the scent gland well before its tip with a tuft of hairs of moderate length. Metaxyphus moderately long and slender, its tip attaining the distal inner margin of the hind coxae. The front leg of the male lacks the carina on the caudal side of the tibia and the carina on the basal fourth of the pala. The tibia is not dorsally produced over the pala but has a distinct pad on its anterior distal margin. The pala is not notched on its dorsal margin and end less twisted than in *H. nigra.* (See drawing on Plate XVIII.)

The middle leg—Femur : tibia : tarsus : claws :: 100 : 42.5 : 29 : 29; rather stout with strong spines, the tibia with some swimming hairs.

Hind leg—Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 93.8 : 112 : 59.6; rather stout; only the base of femur pilose, its upper surface without spines, its lower surface with about 12 spines, tibia with stout spines on anterior and posterior margins and some swimming hairs; the tarsus with spines on anterior margin and swimming hairs on posterior margin. Male abdomen and genital claspers as shown on Plate XVIII.

Comparative notes: This black shining little species is related to *H. nigra* Hungerford from which it differs in lacking any pale figures on the pronotum or hemelytra, in lacking a carina on front tibia of male, but in having a distal pad on tibia. On the male abdomen the prestrigilar comb extends farther to the right of the strigil and consists of smaller teeth than in *H. nigra.* The strigil is broader and has a tuft of hairs extending from the right side over it. Both claspers of the genital capsule are quite different from those of *H. nigra.* (See Plate XVIII.)

Location of types: Described from a series of 6 males, 38 females bearing the following labels: "Perú, S. A., October 24, 1935, F. Woytkowski. Field note 3556. Vic. Sani Bení, 840 m. above sea level. Muddy pool No. 1 in dark jungle." Holotype, allotype and paratypes in Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XX) Besides the above type series, we have in our collection the following: "Peru, S. A., May 15-19, 1935, F. Woytkowski, Vic. San Pedro, 900 m. above sea level. Pools and ponds." One male, 3 females. "Satipo, Peru, S. A., XI, 1942, Pedro Paprzyki." Ten males, 20 females.

Heterocorixa nigra Hungerford

(Plate XVIII, figs. 8, 8a-8c)

1928. *Heterocorixa nigra* Hungerford, H. B. Bull Brooklyn Ent. Soc. XXIII, No. 2, p. 100, Pl. III, figs. 4, 8 and 9. (Fig. 7 = *H. boliviensis*)

1928. *Heterocorixa reinhardti* Lundblad, O. Entomologisk Tidskrift, XLIX, Haft 2, pp. 69-75, figs. 1 to 7.

1933. *Heterocorixa reinhardti,* Jaczewski, T. Annales Musei Zoologici Polonici IV, Nr. 21, p. 337 (Distr.)

1935. *Heterocorixa reinhardti,* Poisson, R. Archives de Zool. Exp. et Gén., LXXVII, p. 465.

Size: Length 4.1 mm. to 4.84 mm.; width across head 1.47 mm. to 1.7 mm.

Color: Nearly black. Head with a dark spot on the front of the vertex and the postocular area brown to black; pronotum dark brown to black with few or many pale irregular spots arranged in transverse series. Sometimes the clavus and base of corium with similar spots in oblique series. Apex of clavus, most of corium and membrane of right hemelytron brown to black; the membrane of left hemelytron white to transparent; the embolar groove frosty black. Legs brown to black save anterior femora. Thorax and abdominal venter brown to black.

Structural characteristics: Head longer than the pronotal disk. Anterior margin of the head as shown on Plate XIX; postocular area broad, its surface along caudal margin wrinkled or coarsely rastrate; head with very faint median carina; facial impression of male shallow and transverse; facial hairs few, appressed; the relative lengths of the finely haired antennal segments are as follows: 1 : 2 : 3 : 4 :: 20 : 12 : 22 : 18. Pronotal disk roughened. Hemelytra smooth, shining with a few appressed slender hairs. Mesoepimeron slender, the osteole of the scent gland well before its tip and with a tuft of long hairs. Metaxyphus long and slender, its tip extending beyond the distal inner margin of the hind coxae. The front leg of the male has a small slender pala, deeply notched on its dorsal margin beyond which it is somewhat twisted. (See Plate XVIII.) Doctor Lundblad figured a characteristic tuft of hairs on the rear of the femur near its base. This is present in about half the specimens of a given series. The tibia with an embrowned carina on its caudal side, dorsally produced over the base of the pala which is dorsally carinate on its basal one-fourth.

The middle leg—Femur : tibia : tarsus : claws :: 100 : 45.5 : 29 : 29; rather stout with strong spines, the tibia with some swimming hairs.

The hind leg— Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 85.8 :

101 : 51.5; rather stout; only the base of femur pilose, its upper surface without spines, its lower surface with about 7 spines; tibia with stout spines on anterior and posterior margins and a few swimming hairs; the tarsus with spines on anterior margin and swimming hairs on posterior margin. Male abdomen as shown on Plate XVIII. Genital claspers as shown on Plate XVIII.

Comparative notes: This nearly black shining little species has two close relatives, *H. woytkowskii,* which is also black, and *H. chapadiensis,* which is not. From the former the males may be distinguished by the dorsal carina on the base of the pala, the deep constriction on its dorsal margin, the dorsal distal projection of the tibia and the lack of a tibial pad. From the latter by its darker color, shorter pronotal disk and its much more slender right clasper.

Nomenclatorial notes: In 1928 both Lundblad and Hungerford, unknown to each other, described new species of *Heterocorixa.* In August of 1928 they compared their descriptions at Stockholm and decided their species were different. However, in 1939 Jaczewski, in correspondence, raised the question of synonymy of *H. reinhardti* with *H. nigra* and sent specimens he had determined as *H. reinhardti.* A careful restudy disclosed that there was a mislabeling on Hungerford's Plate III. Figures 4 and 7 had been exchanged, and Lundblad's excellent description and drawings fit *H. nigra* Hungerford which unfortunately has priority.

Location of types: Described from 2 males and 4 females taken at São Paulo, Brazil, by R. Spitz. Holotype, allotype and 4 paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas. Doctor Lundblad described *H. reinhardti* from a male and female in the Museum of Copenhagen which were collected in Rio de Janeiro by J. T. Reinhardt.

Data on distribution: (Plate XX) Besides the types we have in our collections the following: Ypirango, St. Paulo, Brazil, R. Spitz, 1 male, 2 females; São Paulo, Aug. 7, 1927, E. D. Townsend. 5 females; Estado de São Paulo, Nov., 1928, E. D. Townsend, 1 male, 5 females; Itaquaquecetuba, Brazil, March 22, 1933, N. O. Townsend, 7 males, 3 females; Itaquaquecetuba, Brazil, July, 1933, N. O. Townsend, 15 males, 14 females; Brazil, S. A., São Paulo, Aug. 18, 1928, T. Jaczewski, male and female (labeled *H. reinhardti* Lundb. by Jaczewski); State of Minas Geraes, Ouro Preto, Aug. 23, 1940, H. Kleerekoper, 2 females. We have seen also: S. Paulo, Aug., 1908, 1 male, 1 female (Carnegie Mus.); Ypirango bei São Paulo, Doctor L. Reh, leg. ded. VII, 17, 1896. 1 male. 1 female (Hamburg Mus.)

PLATE XVI

Heterocorixa B. White

Fig. 1. *Heterocorixa westermanni* Lundblad; pala of male.*
Fig. 1a. Dorsal view of male abdomen.*
Fig. 1b. Left clasper of male.*
Fig. 1c. Right clasper of male.*
Fig. 1d. Strigil.*
Fig. 2. *Heterocorixa lundbladi* n. sp.; pala of male.
Fig. 2a. Dorsal view of male abdomen.
Fig. 2b. Left clasper.
Fig. 2c. Right clasper.
Fig. 3. *Heterocorixa jaczewskii* n. sp.; pala of male.
Fig. 3a. Dorsal view of male abdomen.
Fig. 3b. Left clasper.
Fig. 3c. Right clasper.
Fig. 4. *Heterocorixa brasiliensis* Hungerford; pala of male.
Fig. 4a. Dorsal view of male abdomen.
Fig. 4b. Left clasper.
Fig. 4c. Right clasper

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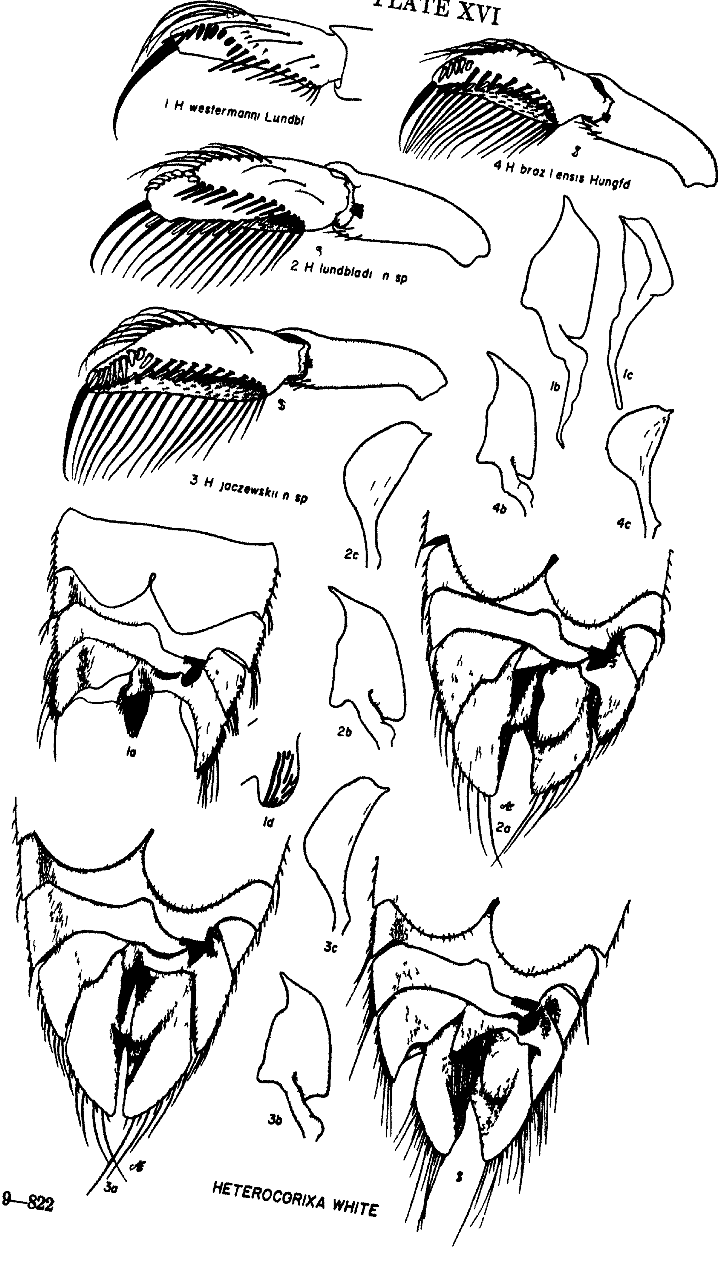
* These drawings taken from Lundblad.

PLATE XVI



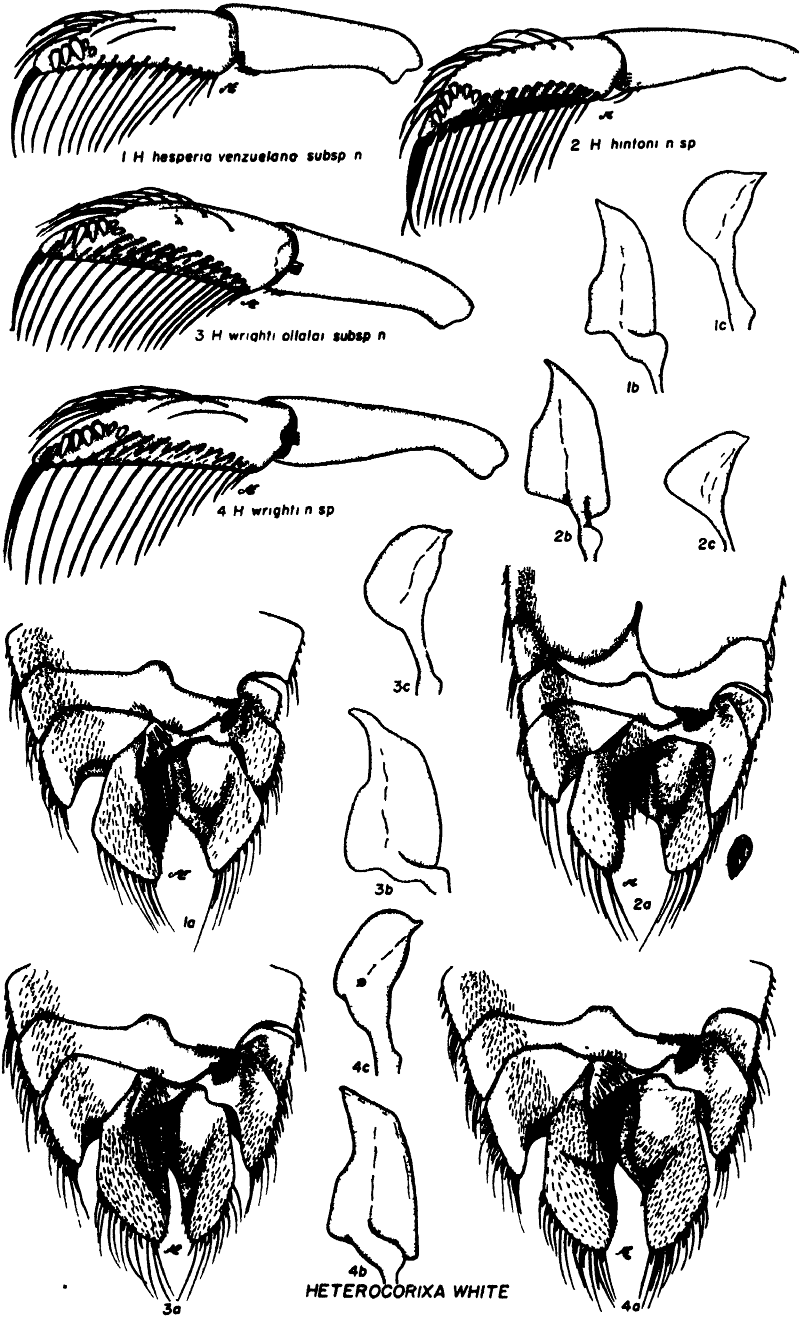
HETEROCORIXA WHITE

PLATE XVII

Heterocorixa B. White

FIG. 1. ***Heterocorixa hesperia venezuelana*** **n. subsp.; pala of male.**
FIG. 1a. Dorsal view of male abdomen.
FIG. 1b. Left clasper of male.
FIG. 1c. Right clasper of male.
FIG. 2. *Heterocorixa hintoni* n. sp.; pala of male.
FIG. 2a. Dorsal view of male abdomen.
FIG. 2b. Left clasper.
FIG. 2c. Right clasper.
FIG. 3. *Heterocorixa wrighti olallai* n. subsp.; pala of male.
FIG. 3a. Dorsal view of male abdomen.
FIG. 3b. Left clasper.
FIG. 3c. Right clasper.
FIG. 4. *Heterocorixa wrighti* n. sp.; pala of male.
FIG. 4a. Dorsal view of male abdomen.
FIG. 4b. Left clasper.
FIG 4c. Right clasper.

PLATE XVII



1 H hesperia venzuelana subsp n

2 H hintoni n sp

3 H wrighti ollalai subsp n

4 H wrighti n sp

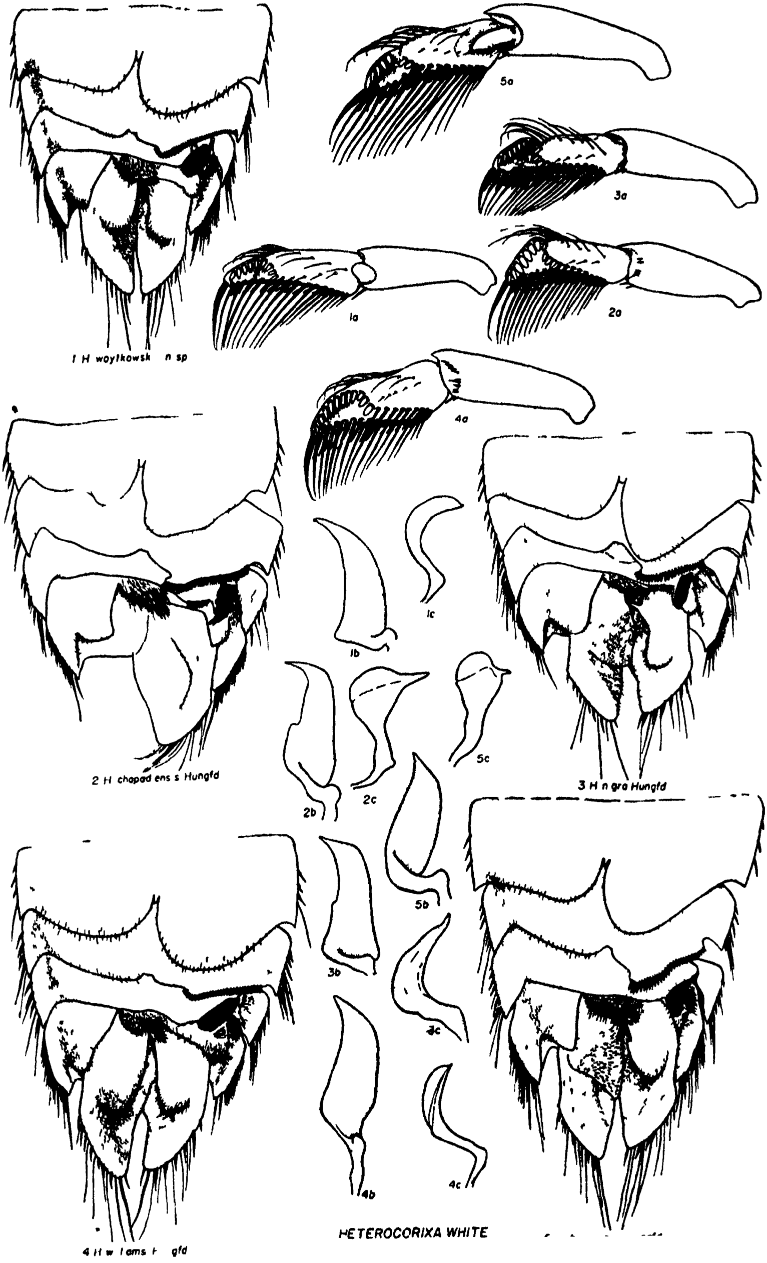
HETEROCORIXA WHITE

PLATE XVIII

Heterocorixa B. White

FIG. 1. *Heterocorixa woytkowskii* n. sp ; dorsal view of male abdomen
FIG. 1a. Front leg of male.
FIG. 1b. Left clasper of male.
FIG. 1c. Right clasper of male.
FIG. 2. *Heterocorixa chapadiensis* Hungerford; dorsal view of male abdomen.
FIG. 2a. Front leg of male.
FIG. 2b. Left clasper.
FIG. 2c. Right clasper.
FIG. 3. *Heterocorixa nigra* Hungerford; dorsal view of male abdomen
FIG. 3a. Front leg of male.
FIG. 3b. Left clasper.
FIG. 3c. Right clasper.
FIG. 4. *Heterocorixa williamsi* Hungerford; dorsal view of male abdomen
FIG. 4a. Front leg of male.
FIG. 4b. Left clasper.
FIG. 4c. Right clasper.
FIG. 5. *Heterocorixa boliviensis* Hungerford; dorsal view of male abdomen
FIG. 5a. Front leg of male.
FIG. 5b. Left clasper.
FIG. 5c. Right clasper

PLATE XVIII



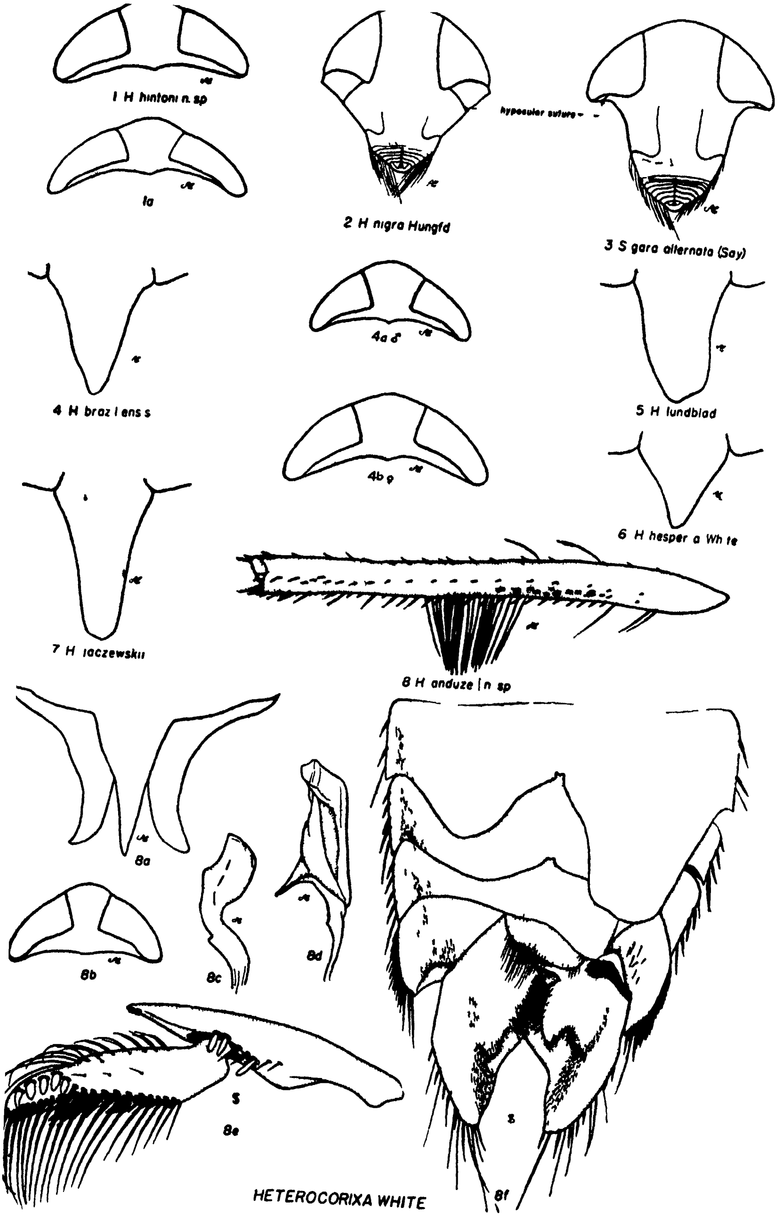
HETEROCORIXA WHITE

PLATE XIX

Heterocorixa B. White

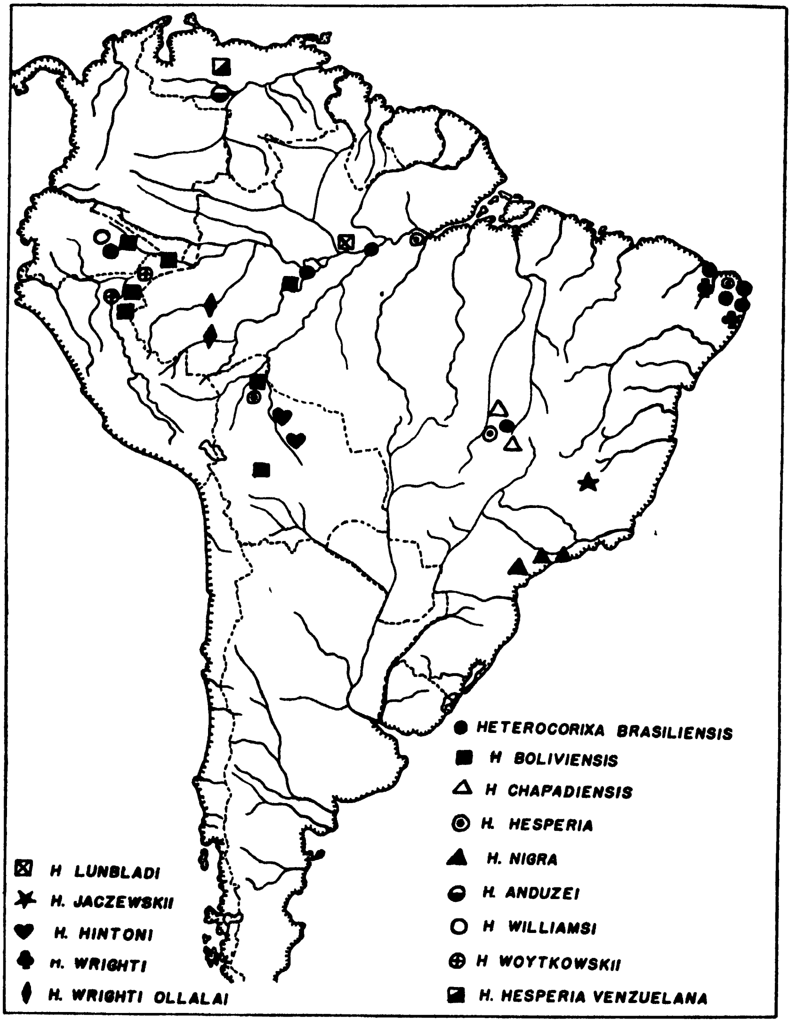
FIG. 1. *Heterocorixa hintoni* n. sp.; head of male.
FIG. 1a. Head of female.
FIG. 2. *Heterocorixa nigra* Hungerford; cephalic view of head.
FIG. 3. *Sigara (Vermicorixa) alternata* (Say); cephalic view of head.
FIG. 4. *Heterocorixa braziliensis* Hungerford; metaxyphus.
FIG. 4a. Head of male.
FIG. 4b. Head of female.
FIG. 5. *Heterocorixa lundbladi* n. sp.; metaxyphus.
FIG. 6. *Heterocorixa hesperia* B. White; metaxyphus.
FIG. 7. *Heterocorixa jaczewskii* n. sp.; metaxyphus.
FIG. 8. *Heterocorixa anduzei* n. sp.; middle femur of male
FIG. 8a. Metaxyphus.
FIG. 8b. Head of male.
FIG. 8c. Right clasper of male.
FIG. 8d. Left clasper of male.
FIG. 8e. Pala of male.
FIG. 8f. Dorsal view of male abdomen.

PLATE XIX



HETEROCORIXA WHITE

PLATE XX


☒ H LUNBLADI
★ H. JACZEWSKII
♥ H. HINTONI
♣ H. WRIGHTI
♦ H. WRIGHTI OLLALAI
● HETEROCORIXA BRASILIENSIS
■ H BOLIVIENSIS
△ H CHAPADIENSIS
◉ H. HESPERIA
▲ H. NIGRA
⊖ H. ANDUZEI
○ H WILLIAMSI
⊕ H WOYTKOWSKII
◩ H. HESPERIA VENZUELANA

CORIXINAE Enderlein

This subfamily contains the majority of the Corixidae.

Rostrum with transverse sulcations. The hypo-ocular suture, when apparent, arising about midway along ventral margin of the eye. Pala of various shapes, with a well-developed palm. Scutellum covered by the pronotum or with only its tip exposed. Hemelytra with embolar groove and well developed nodal furrow. Media vein present through most of its length, usually midway between costal margin and cubitus and usually fused at its apex with cubitus.

This subfamily contains four tribes.

KEY TO TRIBES OF SUBFAMILY CORIXINAE

A. Eyes protuberant* with inner anterior angles broadly rounded. Face depressed in both sexes, densely covered with hair Postocular space broad, head transversely depressed. Dorsal margin of the metathoracic episternum grooved. Lower palmar hairs on pala few (not more than 12 to 14), and long (Type genus *Glaenocorisa*) *Glaenocorisini* tribe new (Holarctic) See p 137

AA. Eyes not protuberant (except in *E tumidacephala*) and inner angles normal Face of females usually not hairy nor depressed Postocular space, if broad, with the head not transversely depressed Dorsal margin of metathoracic episternum usually not grooved. Lower palmar hairs on pala more than 14 or short

- B. With rather thick, well developed apical claw on fore tarsus of both sexes; pala of both narrowly digitiform; males with row of stout short pegs along upper edge of palm; usually with a mat of hair-like setae on frons in both sexes (Type genus *Graptocorixa*) . . . . *Graptocorixini* tribe new (Primarily Neotropic) p 150

- BB With apical claw on fore tarsus spine-like, usually resembling the spines along lower margin of palm, pala not narrowly digitiform, of various shapes, male with row of pegs usually well above the fringe of setae along upper edge of palm, setae on frons not mat-like, often absent

  - C. Hemelytra and pronotum seldom concolorous; pronotum always glabrous; hemelytra often showing scattered short or long setae, frequently both; vein M. fusing with Cu. at base of nodal furrow or sometimes obsolete at apex (Type genus *Corixa*) . . *Corixini* Walton 1940 (World wide) p 197

  - CC. Hemelytra and pronotum concolorous, sometimes with dark spots at base of each of the short hair-like setae which form a uniform pubescence over both; pala of sexes much alike; vein M fuses with Cu. before the nodal furrow a distance equal to or greater than length of latter (Type genus *Agraptocorixa*) . . . . *Agraptocorixini* tribe new (Ethopian-Australasian)

Tribe Glaenocorisini new

The two genera we have assigned to this tribe are boreal in distribution and may be separated as follows:

Key to Genera

A. Pronotum and clavus strongly rastrate. Mesosternum not medianly produced. Male pala dorsally expanded at base. Female with lateral hair tufts on last ventral abdominal segment which is not incised at tip . . . . . . *Glaenocorisa* Thomson

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* Surface more convexly rounded than normal.

AA. Pronotum and clavus not strongly rastrate. Mesosternum medianly produced. Male pala not dorsally expanded at base. Female without definite lateral hair tufts on last ventral abdominal segment; if hairy, then incised at tip.....*Dasycorixa* n. gen.

Glaenocorisa Thomson

(Wash drawing No. 35, Plate VI)

1869. Thomson, C. G. Öfversigt af Sveriges Coriser. Opuscula Entomologica, p. 39, (as subg. of *Corixa* for his *C. cavifrons*).

1873. White, F. Buchanan. Ent. Mo. Magazine, Vol. 10, p. 63, (proposes *Oreinocorixa* as genus for *C. alpestris* D and S, now a synonym of *G. cavifrons* Thomson).

1892. Saunders, Edward. The Hemiptera Heteroptera of the British Islands, p. 341, (his subg. *Oreinocorixa* White but not his *Glaenocorisa* Thoms.).

1894. Wallengren, H. D. J. Entomol. Tidskr., Arg. 15, H. 2, I, p. 670 (as subg. of *Corisa*).

1901-1903. Kirkaldy, G. W. Jl of the Quekett Microscopical Club, Second Ser. VIII, pp. 33-46 (gives *Glaenocorisa* Thomson as subg. of *Corixa* Geoffroy and *Oreinocorixa* White as syn.)

1909. Oshanin, B. Verzeichnis der Palaearktischen Hemipteren, Vol. I, p. 996 (as genus).

1912. Oshanin, B. Katalog der Palaarktischen Hemipteren, p 92, (as genus).

1924. Jaczewski, T. Annales Zoologici Musei Polonici Historiae Naturalis, III, p. 23.

1928. Jaczewski, T. Annales Musei Zoologici Polonici, VII, pp 49, 53-56, (geog. dist.).

1930. Jones, H. P. Entomologist's Record, XL-XLII; reprint, p 77

1935. Poisson, R. Archives de Zoologie Expérimentale et Générale, LXXVII, pp. 457 and 459, (would consider *G. cavifrons* Thoms. as a *Sigara* with primitive characters)

1935. Stichel, Wolfgang. Illustrierte Bestimmungstabellen der Deutschen Wanzen, Lief 11, p 312.

1938 China, W. E. The Ent. Mo Magazine, LXXIV, p 39.

1939. Macan, T. T. Freshwater Biological Association of the British Empire, Scientific Publ. No 1, pp. 7 and 17.

1943. China, W. E. The Generic Names of British Insects, Pt 8, p. 283.

1944. Hungerford, H. B. Bull. Brooklyn Ent. Soc., XXXIX, No. 1, pp. 32-34 (syn. notes).

1946. Brown, E. S. Trans Roy. Ent. Soc. London, XCVI, Pt. 1, pp. 1-10, 1 pl. (Concludes that *G. propinqua propinqua* [light form] and *G. propinqua cavifrons* [dark form] are the same species.)

Medium-sized corixids with protuberant eyes; the head transversely depressed between the medio-posterior angles of the eyes; postocular space broad especially at inner angle of the eyes with the margin more or less upturned; front flattened in female to concave in male and densely covered with long white hairs. Pronotum with a prominent median carina extending beyond the middle, a faint to distinct ridge on the anterior and lateral margin of the pigmented field; lateral lobe of pronotum elongate, obliquely truncate, its anterior angle produced. Pronotum and clavus strongly rastrate. Metaxyphus an equilateral triangle. Pala with not more than a dozen or fourteen long bristles on lower margin. Male pala carinate on outside and inner surface crossed by an oblique ridge beyond which the pegs are bristlelike (see Plate XXI, figs. 1a and 2). Anterior tibia short with several long bristles on inner side, dorsally carinate in the male. Anterior femur with lower margin sharp edged in both sexes and expanded in the male. Ventral surface of hind femur shining, the pilose area restricted to the base.

Female with last ventral abdominal segment broadly expanded in the middle, not incised, a patch of hairs on either side near the base. Male strigil dextral.

Genotype: *G. cavifrons* Thomson, now called *G. propinqua* (Fieber).

A genus of only two or three species. *Glaenocorixa hybrida* Hungerford belongs elsewhere, and *Glaenocorixa hugoscotti* Hutchinson has been assigned to *Pseudoglaenocorisa* by Jaczewski.

The genus is northern in distribution and Jaczewski, 1928, says of *G. cavifrons* "it shows itself in the so-called glacial relics of Europe."

Glaenocorisa quadrata Walley

(Plate XXI, figs. 1, 1a-1b)

1930. *Glaenocorisa quadrata* Walley, G. S. Can. Ent., LXII, pp 80-81, pl. 10, figs. 10-18.

1944. *Glaenocorisa quadrata,* Hungerford, H B Bull. Brookl. Ent. Soc , XXXIX, pp 32-33. (Dist.)

Size: Length 8 mm. to 9.66 mm.; width across head 2.35 mm. to 2.56 mm.

Color: General facies dark. Pattern similar to that of *G. propinqua* (Fieber). Head above brownish; face yellowish, suffused with brown. Pronotum brownish black with 9 to 10 slightly confused dirty yellowish cross lines. Clavus with a few irregular pale bars on basal third, separated by much broader black spaces, beyond with interrupted transverse flecks. Corium and membrane with scattered yellowish flecks which do not form rows or series, the blackish ground color predominant. Venter blackish, the abdominal sternites narrowly pale at apices.

Structural characteristics: Head as seen from above three-arched as in *G. propinqua* (Fieber) frontal depression of male deep, of female flattened, densely covered with hair in both sexes. Antennal segments: 1 : 2 : 3 : 4 :: 28 : 20 : 55 : 25. The interocular space a little broader than the width of the eye measured in projection; postocular space rather broad. Prothoracic lateral lobe elongate, obliquely truncate at apex. Pronotum, clavus and base of corium rastrate. Front leg of male as shown on Plate XXI, figure 1a. The ventral margin of femur sharp edged in both sexes. The middle leg: femur : tibia : tarsus : claws :: 100 : 47.3 : 39.9 : 31.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.5 : 129.5 : 46.3. Metaxyphus in shape of an equilateral triangle. The male genital capsule and abdominal dorsum as shown on Plate XXI, figures 1 and 1b.

Location of types: In the Canadian National Collection, Ottawa. Holotype male and allotype female from Harrington Harbor, *Quebec,* July 3, 1929, W. J. Brown. Paratypes female, Mecatina Sanctuary, *Quebec,* July 9, 1929; female, Bonne Esperance, *Quebec,* July 14, 1929; female, Bradore Bay, *Quebec,* July 27, 1929, collected by W. J. Brown.

Comparative notes: This species appears on the whole a little larger than *G. propinqua* (Fieb.). It has a broader prothoracic lateral lobe. The male pala is relatively broader and the peg row reaches the dorsal margin. The differences in the abdominal dorsum and in the right claspers are shown on Plate XXI.

Data on distribution: (Plate XXIII) We have in the Francis Huntington Snow Collections at the University of Kansas the following:

CANADA: Bradore Bay, *Quebec,* July 11, 1930, W. J. Brown, 1 male; same place, July 6, 1930, 1 female; Aklavik, N. W. T., Aug. 25, 1931, Bryant Lot 254, 1 female; same place, Aug. 27, 1931, Bryant Lot 257, 1 male; same place, July 25, 1931, Bryant Lot X, 1 male; *Newfoundland,* Trinity Goose Cove, Doctor E. Hentschel, July 13, 1910; from Hamburg Mus., 1 male.

EUROPE: Aal, *Norway,* Strand, 1 male, 1 female.

PLATE XXI

Glaenocorisa Thomson

FIG. 1. *Glaenocorisa quadrata* Walley; genital capsule of male.
FIG. 1a. Pala of male.
FIG. 1b. Dorsal view of male abdomen.
FIG. 2. *Glaenocorisa propinqua* (Fieber)*; pala of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Dorsal view of male abdomen.

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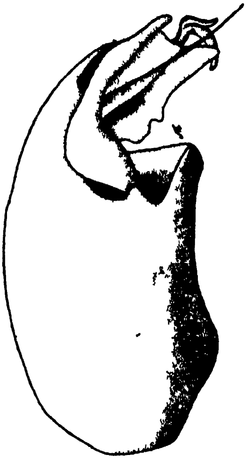
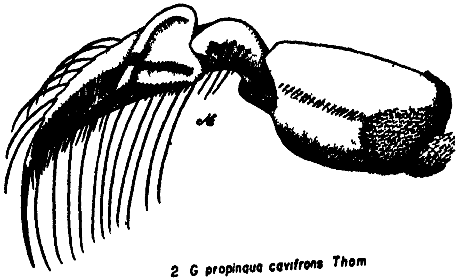
* Brown, E. S. (1946), concludes that *G. propinqua propinqua* (Fieber) and *G. propinqua cavifrons* Thomson are the same species.

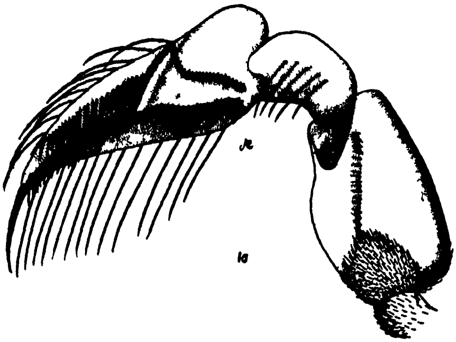
PLATE XXI



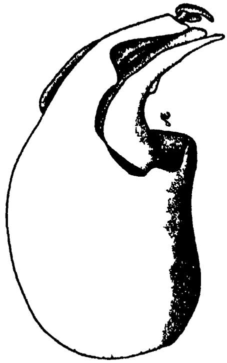
1 G quadrata Walley



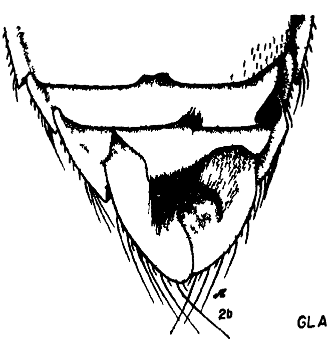
2 G propinqua cavifrons Thom



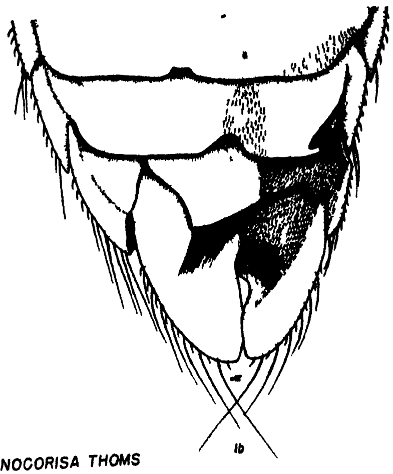
1a



2a



2b



1b

GLAENOCORISA THOMS

Dasycorixa new genus

This genus resembles *Glaenocorisa* Thompson in having the surface of the eyes more convexly rounded than normal, with their inner anterior angles broadly rounded; in having the face depressed in both sexes and densely covered with hair; in having the postocular space broad and the head transversely depressed; in having the dorsal margin of the metaepisternum somewhat grooved; in having the lower palmar hairs of the pala few and long; in having the lateral lobe of the prothorax elongate, its base broader than its tip with the anterior distal angle turned inward. It differs from *Glaenocorisa* Thomson in not being strongly rastrate on pronotum and hemelytra and the latter more hairy; in having a weaker, more slender metaxyphus; in having the male palar pegs uniform and not some of them spine-like; the shape of the male pala elongate with much less developed longitudinal carina on the outside; the anterior tibia of the male without the distal pad, and the last ventral abdominal segment of the female lacking the definite hair tufts and definitely incised at apex in two of the three species.

Genotype: *Glaenocorisa hybrida* Hungerford.

KEY TO SPECIES OF DASYCORIXA

1. Small species, less than 8 mm. long .... *D. johanseni* (Walley) (p. 142)
   Larger species, average more than 8 mm. long. 2
2. Seventh ventral abdominal segment of female not notched at apex; seventh dorsal abdominal segment of male with median lobe small and barely discernible. *D hybrida* (Hungerford) (p. 144)
   Seventh ventral abdominal segment of female notched at apex; seventh dorsal abdominal segment of male with median lobe large and triangular *D. rawsoni* n. sp (p. 145)

Dasycorixa johanseni (Walley)

(Plate XXII, figs. 3, 3a and 3b)

1931. *Arctocorixa johanseni* Walley, G. S. Can. Ent., LXIII, No. 10, pp. 238-239, text figs. 1-5 (desc. from Man., Canada).

Size: Length 6 mm. to 7+ mm. Width of head across eyes 2 mm. to 2.1 mm. General shape rather stout and compact.

Color: General facies medium brown. Pronotum crossed by eight or nine narrow, irregular dark lines; clavus and corium with dark and light in about equal proportions, markings reticulate; pattern continuous over membrane; embolium, head, and limbs pale; venter smoky.

Structural characteristics: Head about three-fourths as long as pronotal disk; vertex slightly produced as seen from above; interocular space greater than width of an eye; eyes rather prominent; postocular space broad at inner angles of eyes but narrowing laterally; male fovea broadly oval, attaining eye margins, and fairly deep; face of female flattened and faces of both sexes covered with long, pale hairs; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 16 : 42 : 20 ♂ ; 1 : 2 : 3 : 4 :: 20 : 16 : 45 : 22 ♀ . Pronotal disk with median carina plainly visible for one-third its length; disk about twice as broad as long, rounded apically; pronotum finely rastrate, hemelytra somewhat rugulose and covered with long, pale hairs; pruinose area of embolar groove posterior to the nodal furrow equal in length to that of claval suture, though both are short. Lateral lobe of prothorax narrow, longer than broad, narrower at apex than at base; mesoepimeron at level of scent gland osteole about half the width of the lateral prothoracic lobe; osteole near tip of mesoepimeron; metaxyphus small, narrow, acutely pointed at tip. Front leg of female of usual shape. Front leg of male pala—long and slender, 32 pegs in single, slightly curving, unbroken row; tibia longer than broad, two strong setae inwardly, dorsal carina not thin, extending from base to apex; femur moderately broad, about eight rows of stridulatory pegs on inner surface. Middle and hind legs slender, the proportions of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 46.3 : 32.5 : 32.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 90.8 : 124.9 : 52.2. Male asymmetry dextral; strigil small, oval, of 5 regular combs. Male pala, abdomen and genitalia as on Plate XXII, figs. 3, 3a and 3b. Seventh ventral abdominal segment of female broadly notched at apex.

Comparative notes: This species by its smaller size is easily separated from the other two species in the genus.

Location of types: Holotype male, No. 3244, allotype female, and some paratypes labeled "Fort Churchill, Man., Oct. 23, 1929, F. Johansen," in the Canadian National Collection, Ottawa, Ontario. Two male and two female paratypes, same collection and data as above, in the Francis Huntington Snow Entomological Collections, University of Kansas. Other paratypes in the private collection of Mr. J. R. de la Torre-Bueno.

Data on distribution: (Plate XXIII) Known only by the type series.

Dasycorixa hybrida (Hungerford)

(Plate XXII, fis. 1, 1a and 1b; wash drawing No. 43, Pl. VII)

1926. *Glaenocorixa hybrida* Hungerford, H B. Can. Ent, LVIII, p. 271, Pl. figs. 3 and 6 (desc from Minn).

1930. *Glaenocorixa hybrida*, Hutchinson, G. E. Proc. Zool. Soc. London, XXIX, Pt. 2, p. 461 (doubts that *hybrida* is congeneric with *cavifrons* and *hugoscotti*).

1935. *Glaenocorixa hybrida*, Poisson, R. Archives de Zool Exp. et Gén., LXXVII, p. 459.

Size: Length 7.6 mm. to 9.2 mm. Width of head across eyes 2.6 mm. to 2.8 mm. General shape rather stout and compact.

Color: General facies medium to dark brown. Pronotum crossed by nine somewhat irregular dark bands, a little narrower or equal to the pale interspaces. Color pattern of hemelytra consisting of broken, irregular zigzag patches of dark and light intermingled; pale pattern on basal half of corium arranged in somewhat longitudinal series; dark pigment tending to coalesce on inner distal angle of corium. Membrane separated from corium by a pale line; membranal pattern pale and reticulate. Embolium, limbs, and thoracic venter pale; head and abdominal venter smoky to black.

Structural characteristics: Eyes prominent and remote from rear margin of head which is produced to a distinct angle in the middle; head two-thirds as long as pronotal disk; interocular space a little wider than width of an eye measured in projection; vertex rounded out beyond eye margins in both sexes; face short, flattened in both sexes, and covered with long, light hairs; male fovea deep and broad, attaining eye margins; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 19 : 41 : 20 ♀. Pronotal disk with median carina plainly visible on anterior third; pronotal disk with lateral margin carinate, rounded apically; pronotum finely rastrate, hemelytra lightly rugulose and shining, with pale hairs on corium and membrane; pruinose area of embolar groove posterior to nodal furrow equal in length to that of the claval suture. Lateral lobe of prothorax elongate, broader at base than at tip, sides tapering slightly, anterior distal angle produced and turned inward; mesoepimeron narrow with osteole near the tip; metaxyphus long, narrow, and acutely pointed. Pala slender in both sexes, though broader than in *Cymatia*. Male pala with 33 pegs in a single, unbroken row; tibia about one-third as long as pala, two setae inwardly, with a dorsal carina and no pad; femur relatively stout, broadest at base, with about 8 rows of stridulatory teeth on inner surface. Middle and hind legs relatively slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 49.4 : 36.8 : 31.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100 : 123.5 : 49. Male asymmetry dextral; strigil fairly small, suboval, of 9 regular combs. Right clasper broadest on basal portion, tapering distally; tip not bifurcate. For details of male pala, abdomen, and genitalia see Plate XXII, figs. 1, 1a and 1b. Female with seventh ventral abdominal segment sinuous across tip.

Comparative notes: This species, which I described as a *Glaenocorisa,* belongs with two other species in a new genus. From them it is separated by the key above.

Location of types: Described from holotype male labeled "St. Louis Co., Minn., Aug. 14, 1922, Babbit, H. B. Hungerford." Allotype female, "Golf Club Pond, St. Paul, Minn., July 28, 1921, H. B. Hungerford." Both are in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XXIII).

U. S. A.: *Minnesota.* St. Louis, Co., Aug. 14, 1922, H. B. Hungerford, 1 male (holotype); St. Paul, golf pond, July 28, 1921, same collector, 1 female (allotype).

Canada: *British Columbia:* Vernon, Dec., 1908, 1 male, 2 females (Parshley).

Dasycorixa rawsoni n. sp.

(Plate XXII, figs. 2, 2a and 2b)

Size: Length 6.97 mm. to 9.4 mm. Width of head across eyes 2.3 to 2.7 mm. General shape rather long and slender.

Color: General facies light. Pronotum crossed by 13 to 14 very narrow, irregular dark lines. Hemelytral pattern of wavy dark lines, much broken, and covering considerably less space than pale areas. On corium the pale areas arranged in 3 or 4 faintly longitudinal lines. Pattern continuous over membrane, though in some specimens a brownish line marks point of separation. Embolium, head, and limbs pale. Thoracic venter pale, abdominal venter pale to smoky.

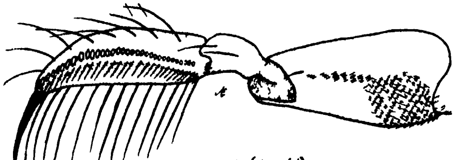
Structural characteristics: Head two-thirds as long as pronotal disk; interocular space a little wider than width of an eye; postocular area broad at inner angles of eyes, narrowing laterally; vertex projecting beyond eye margins in both sexes, as seen from above; faces of both sexes covered with long hairs; female face flattened, male concave; male fovea deep and broad, attaining eye margins laterally and extending dorsally almost to margin of vertex; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 25 : 20 : 53 : 23 ♂;

PLATE XXII

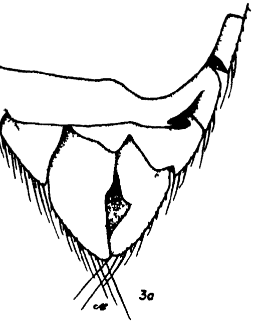
Dasycorixa new genus

FIG. 1. *Dasycorixa hybrida* (Hungerford); front leg of male
FIG. 1a. Dorsal view of male abdomen.
FIG. 1b. Genital capsule of male.
FIG. 2. *Dasycorixa rawsoni* n. sp.; front leg of male.
FIG. 2a. Dorsal view of male abdomen.
FIG. 2b. Genital capsule of male.
FIG. 3. *Dasycorixa johanseni* (Walley); front leg of male.
FIG. 3a. Dorsal view of male abdomen.
FIG. 3b. Genital capsule of male.

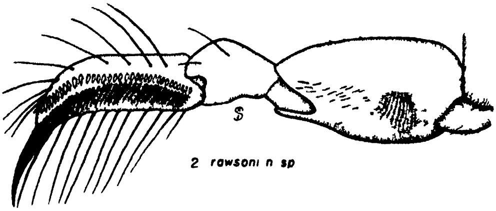
PLATE XXII



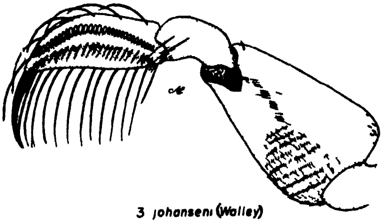
1 hybrida (Hungfd)



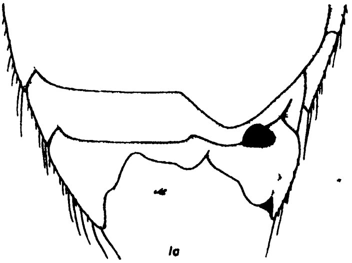
3a



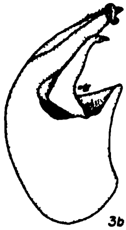
2 rawsoni n sp



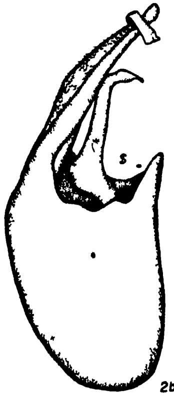
3 johanseni (Walley)



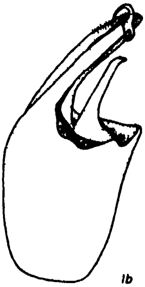
1a



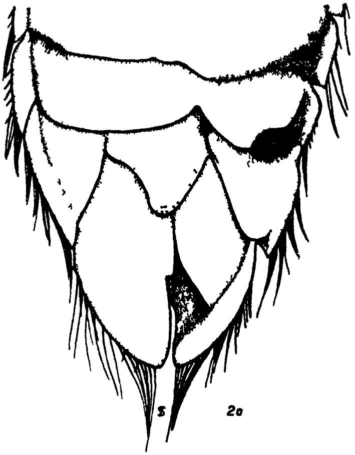
3b



2b



1b



2a

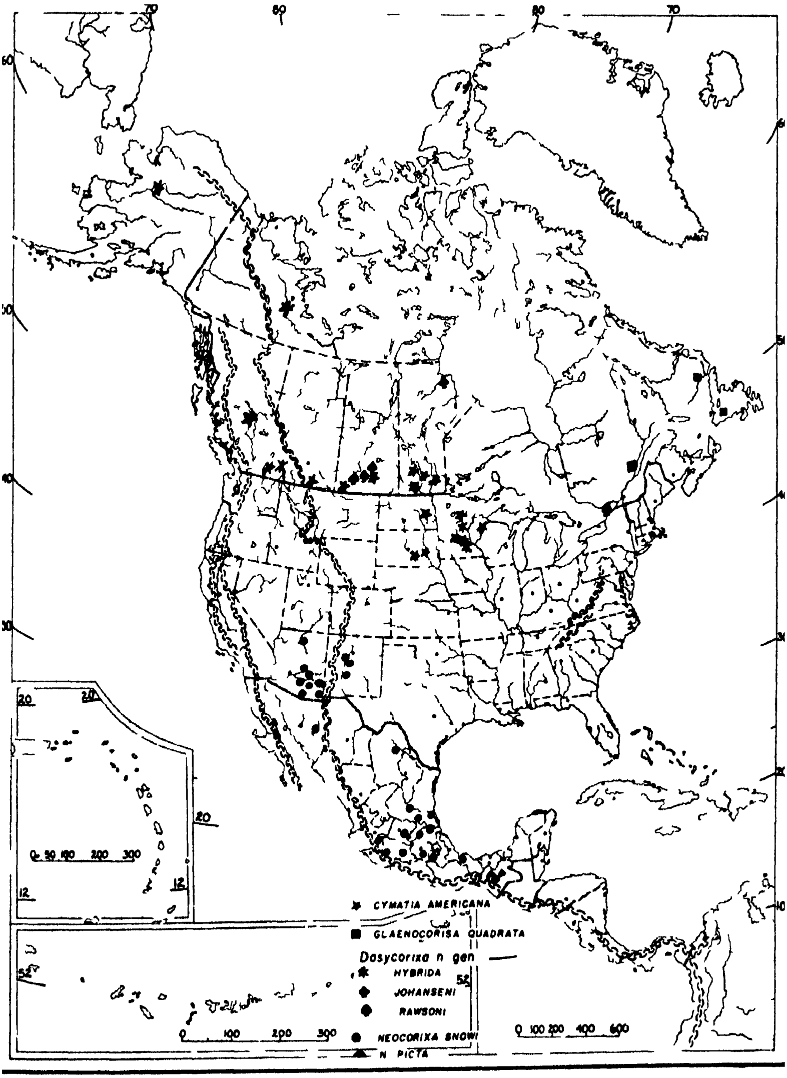
1 : 2 : 3 : 4 :: 24 : 22 : 57 : 25 ♀. Pronotal disk with median carina plainly visible on anterior half and usually discernible throughout, disk rather pointed apically; pronotum faintly rastrate and hemelytra somewhat rugulose, the latter with a few long, pale hairs; pruinose area of embolar groove posterior to the nodal furrow equal in length to that of the claval suture. Lateral lobe of the prothorax elongate, a little broader at base than at tip; mesoepimeron narrow with osteole near the tip, width at level of osteole about two-thirds that of prothoracic lobe; metaxyphus as broad at base as long, but abruptly narrowed for most of its length and pointed. Front leg of female of usual shape, tibia with 3 strong setae. Front leg of male: pala elongate, about four times as long as broad, with 38 pegs in a single, unbroken, slightly curving row; tibia not quite half as long as pala, pronounced, though not narrow, dorsal carina with 3 strong setae on inner surface as in female; femur relatively stout, broadest across base, the lower edge rather sharp and with about 10 rows of stridulatory pegs on inner surface. Middle and hind legs slender, the proportion of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 51 : 38.9 : 38.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100 : 136 : 50. Male asymmetry dextral; strigil large, suboval, of 14 to 15 irregular combs. Median lobe of seventh abdominal segment large and almost triangular; right lobe of same segment with a projection near juncture with sixth segment, to the right of the strigil. For details of male pala, abdomen, and genitalia see Plate XXII, figs. 2, 2a and 2b. Seventh ventral abdominal segment of female notched at tip.

Comparative notes: In color pattern this species is more like *D. johanseni* (Walley) than *D. hybrida* (Hungerford) from which it is distinguished by the key.

Location of types: Holotype male, allotype female, and 1 female paratype labeled "S. Saskatchewan, Can., Lizard Lake, Aug. 10, 1938, D. S. Rawson;" also 2 male and 3 female paratypes labeled "S. Saskatchewan, Can., Antelope Lake, July 31, 1938, D. S. Rawson" in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XXIII) Besides the type series we have the following: *S. Saskatchewan:* Loon Lake, June 14, 1939, J. E. Moore, 4 males, 3 females; Birch Lake, June 15, 1939, J. E. Moore, 3 females.

PLATE XXIII


70
80
80
70
60
50
40
30
20
20
20
12
12
0 50 100 200 300
52
52
0 100 200 300
0 100 200 400 600
CYMATIA AMERICANA
GLAENOCORISA QUADRATA
Dasycorixa n gen
HYBRIDA
JOHANSENI
RAWSONI
NEOCORIXA SNOWI
N PICTA

Tribe *Graptocorixini* new

This tribe contains two genera, both from the western United States and Mexico. They may be separated by the following key:

A. Male abdomen sinistral, strigil absent. Female abdomen slightly asymmetrical. Face of female slightly concave.......... ... . *Neocorixa* Hungerford (See p. 150)

AA. Male abdomen dextral, strigil present. Female face not concave and abdomen normal ....*Graptocorixa* Hungerford (See p 156)

Neocorixa Hungerford

1925. Hungerford, H. B. Bull. Brooklyn Ent. Soc. XX, No. 1, pp. 19-20.

1927. Poisson, R. Bull. de la Société Entomologique de France, 1927, pp 74-75. (Assigned *A. vermiculata* (Put.) to this genus in error.)

1928. Hungerford, H. B. Annals Ent. Soc. Amer., XXI, p. 141.

1928. Jaczewski, T. Annales Musei Zoologici Polonici VII, pp. 59-61.

1935. Poisson, R. Archiv. de Zool Exp. et Gén., LXXVII, p. 457.

1938. Hungerford, H. B. Bull. Brooklyn Ent. Soc., XXXIII, pp. 170-171.

1940. Hutchinson, G. E. Trans Conn. Acad. Arts and Sciences. XXXIII, p. 404. (Places *Neocorixa* in the tribe Cymatiini Walton along with *Cymatia*.)

This genus has the general facies of *Graptocorixa*. The pala in both sexes is slender, falcate and ends in a stout claw. The face is short and broad, the frontal fovea marked and covered with a dense mat of hair in both sexes. The lateral lobe of the prothorax has the anterior distal angle produced and turned in. Mesosternum medianly bidentately produced. Hind femur pilose only at the base and along the caudal margin, its ventral shining surface with forty or more small peg-like spines, irregularly spaced. The asymmetry of the male sinistral. True strigil absent. The female abdomen also definitely asymmetrical due to a depression on the right side of the fifth ventral and a tuft of hair on the sixth behind it.

Genotype: *Neocorixa snowi* Hungerford.

Distribution: Southwestern United States and Mexico.

Neocorixa snowi Hungerford

(Plate XXIV, figs. 1, 2, 5, and 7; wash drawing No. 37, Plate VI)

1925. *Neocorixa snowi* Hungerford, H. B. Bull. Brooklyn Ent. Soc, XX, pp. 19-20, Pl. II, fig. 8. (New genus, new sp. from Arizona.)

1928. *Neocorixa snowi,* Hungerford, H. B. Ent. News XXXIX, p. 156. (Record from New Mexico.)

1928. *Neocorixa snowi,* Hungerford, H. B., Annals Ent. Soc. Amer., XXI, p 141, Pl. VIII, fig. 13.

1935. *Neocorixa snowi,* Poisson, R. Archiv. de Zool. Exp. et Gén., LXXVII, p. 457.

1938. *Neocorixa snowi,* Hungerford, H. B. Pan-Pacific Ent. XIV, p. 76. (Record from Mexico.)

1938. *Neocorixa snowi,* Hungerford, H. B. Bull. Brooklyn Ent. Soc., XXXIII, pp. 170-171, Pl. VII, figs. 1, 2, 5, 7.

Size: Length 6.9 mm. to 8.2 mm. Width across head 2.3 mm. to 2.6 mm.

Color: General color usually dark, both dorsum and venter. Head and legs ivory to yellow, the second segment of hind tarsus brown. Pale patches on the sides of each thoracic segment, the mesothoracic epimeron usually suffused with black. Pronotum usually crossed by fourteen or more slender, more or less broken and anastomosing black bands which are about as wide as the intermediate pale bands. Except at the base of the clavus, the pale finely zigzag lines are narrower than the dark ones and the sculpturing of the hemeltyra is such that they appear as elevated across ridges; the slender pale lines of the membrane are more or less broken, but nevertheless give a crossbar effect. In many specimens the pattern of both clavus and corium is obscured by dark brown; nodal furrow covered by a large sooty blotch.

Structural characteristics: The so-called beak reduced. Frontal depression of male oval, not reaching the eyes; this area in both sexes densely clothed with fine white hairs. The relative length of the antennal segments 1 : 2 : 3 : 4 :: 30 : 20 : 42 : 15. The pronotum and hemelytra somewhat roughened, the latter more or less rugulose, a few fine hairs on corium; the pruinose area of embolar groove posterior to nodal furrow : cubital ridge as 10 : 21 and a little longer than the pruinose area of the claval fold. Mesoepimeron slender with the osteole of the scent gland near its tip. The metaxyphus nearly as long as the inner margin of the hind coxa. Lower margin of the basal half of front femur provided with a few strong spines; the tibia with several stout spines, the pala long, slender, tapering to a single stout claw in both sexes; the male pala provided with about thirty-two pegs arranged in a row just above the palm. The middle leg—femur : tibia : tarsus : claws :: 100 : 40 : 37 : 23. The hind leg—femur : tibia: tarsus 1 : tarsus 2 :: 100 : 97 : 125 : 45. The asymmetry of the male sinistral, a curious patch of short hook-like projections on the left side of the sixth dorsal abdominal tergite. The genital capsule of male as shown on Plate XXIV. The last ventral abdominal segment of female not rectangularly produced, and the notch on the inner ventral margin of the anal lobes deep. (See Plate XXIV.)

Comparative notes: This species has the general facies of some of the *Graptocorixa* species and the palae of the front legs are similar but it differs from any of them in having the male abdomen sinistral with a patch of short hooks replacing a strigil and the female abdomen also showing asymmetry.

Location of types: Described from 4 males and 4 females bearing the label "Santa Rita Mts., Ariz., 5 to 8,000 ft., June, F. H. Snow." Holotype, allotype and paratypes in Francis Huntington Snow Collection, University of Kansas.

Data on distribution: (Plate XXIII) We have, besides the types, the following before us:

U. S. A.: *Arizona:* Santa Catalina Mts., Dec. 21, 1935, Bryant (Bryant); Tucson, Jan. 27, 1935, Bryant (Bryant); Gila Co., Aug. 5, 1927, L. D. Anderson, P. A. Readio, R. H. Beamer, 53 males, 78 females; Sierra Ancha Mts., Gila Co., Duncan (Lutz); Santa Rita Mts., July 17, 1932, R. H. Beamer, 6 females; Huachuca Mts., July 8 1932, R. H. Beamer, 2 females; Chiricahua Mts., July 8, 1932, R. H Beamer, 1 male, 4 females; same place, July 5, 1940, L. C. Kuitert, 1 male, 4 females; same place, Rustler's Park, 8,000-8,500 ft., June 16, 1932, Duncan (Lutz); Coconimo Co., General Springs, Aug. 29 1935, I. J. Cantrall (Mich.), 3 males, 4 females.

New Mexico: Torrance Co., July, 1925, C. H. Martin, 5 males, 7 females; Silver City, July 22, 1936, M. B. Jackson, 15 males, 17 females, 3 nymphs; Lordsburg, July 16, 1937, H. Ruckes (Lutz).

MEXICO: *Chiapas:* Lake Tepancuapan, Aug. 29, 1937, H. D. Thomas, 9 males, 14 females.

Veracruz: Orizaba, July 30, 1937, H. D. Thomas, 2 females.

Michoacán: Morelia, Sept. 4, 1938, H. D. Thomas, 1 male, 2 females; near L. Cuitzco, Aug. 10, 1932, Hobart Smith, 3 males, 1 female; Tancítaro, July 8, 1940, F. Schacht, 20 males, 8 females in permanent pool.

Jalisco: Tecolotlan, Sept. 17, 1938, H. D. Thomas, 1 male.

Sonora: Tepopa, S. Charibo, March 9, 1935, H. S. Gentry, 1 female.

Guanajuato: near Santa Rosa, Aug. 14, 1932, Hobart Smith, 1 male.

San Luis Potosí: Aug. 5, 1944, H. D. Thomas, 1 male, 1 female.

Coahuila: Saltillo, Sept. 10, 1937, H. D. Thomas, 8 males, 12 females.

Hidalgo: San Antonio near El Salto, 5,000 ft. above sea level, semitropical, June 10, 1937, Meldon Embury, 11 males, 3 females; same place at 9,300 ft. in Pine Forest, June 5, 1937, Meldon Embury, 1 male; El Chico Nat. Park, 9,000 ft., Aug. 2, 1938, Ed Taylor, 2 females; El Chico, Sept. 23, 1938, H. D. Thomas, in rapid clear stream, 11 males, 8 females.

Puebla: Puebla, July 24, 1937, H. D. Thomas, 2 females; Aug. 16, 1937, 1 male, 2 females.

Mexico: Tejupilco, Temescaltepec, June 24, 1933, Hinton and Usinger (Calif. Acad.); Real de Arriba, Dist. of Temascaltepec, Alt. 1960 meters, May, June, 1933, H. E. Hinton, 49 males, 70 females; 12 miles west of Villa Victoria, Mar. 23, 1939, H. Smith, Alt. 2,560 meters, 1 male, 2 females.

Mr. Henry Thomas records on one label taking this species "in a rapid clear stream" and F. Schacht took it "in a permanent pool." Elevations that have been given range from 5,000 feet to 9,300 feet.

Neocorixa picta Hungerford

(Plate XXIV, figs 3, 4, 6 and 8)

1938 *Neocorixa picta* Hungerford, H B Bull Brooklyn Ent Soc XXXIII, pp 170-172, Pl VII, figs 3, 4, 6, 8

Size: Length 7.9 mm. to 8.5 mm.; width of head 2.6 mm. to 2.8 mm.

Color: General color dark, both dorsum and venter, but slightly lighter than in *Neocorixa snowi* Hungerford because of the much coarser barring on the pronotum and hemelytra and an extension of the pale areas on the venter. The mesothoracic epimeron, for example, is light in color, whereas in *N. snowi* it is usually suffused with black. Head and legs yellowish to ivory; the second segment of hind tarsus embrowned. Pronotum crossed by about a dozen slender, much broken and anastomosing black bands. The zigzag banding of the hemelytra coarse, the pale bands, on the whole, as broad at least as the black, the pattern continuing uninterrupted on the membrane.

Structural characteristics: The so-called beak reduced. Frontal depression of male broadly oval, not reaching the eyes; this area in both sexes densely clothed with fine white hairs. The relative length of the antennal segments—1 : 2 : 3 : 4 :: 28 : 20 : 46 : 13. The pronotum and hemelytra somewhat roughened, the latter more or less rugulose, a few fine hairs on the corium; the pruinose area of embolar groove posterior to nodal furrow: cubital ridge as 12 : 26, and a little longer than the pruinose area of the claval fold. Meso-epimeron slender with the osteole of the scent gland near its tip. The metaxyphus nearly as long as inner margin of hind coxa. Lower margin of the basal half of front femur provided with a few strong spines; the tibia with several stout spines; the pala long, slender, tapering to a single stout claw in both sexes; the male pala provided with about forty-four pegs arranged in a row just above the palm. The middle leg—femur : tibia : tarsus : claws :: 100 : 37.5 : 32.5 : 30. The hind leg—femur : tibia : tarsus 1 : tarsus 2 :: 100 : 94.3 : 122 : 35.5. The asymmetry of the male sinistral but no strigil or patch of short hook-like projections. The genital capsule of male as shown on Plate XXIV. The last ventral abdominal segment of female rectangularly produced as shown in the drawing, and the notch on the inner ventral margin of the anal lobes shallow. (See Plate XXIV.)

Comparative notes: This species is distinguished from *N. snowi Hungerford by the broad pale bands in the zigzag pattern of the hemelytra, by the shape of the genital clasper, the lack of the* "stridular" patch of hooks in the male and by the shape of the last ventral abdominal segment and the anal lobes in the female. See the drawings on Plate XXIV.

Location of types: Described from 67 specimens (24 males and 43 females) bearing the label "San Cristóbal, *Chiapas,* Mexico, Sept. 2, 1937, H. D. Thomas." These are in the Francis Huntington Snow Collections, University of Kansas.

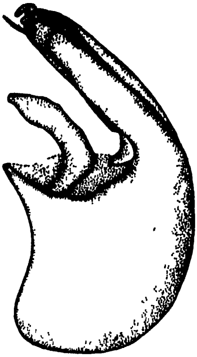
Data on distribution: (Plate XXIII) Besides the type series, we have the following: "Ciudad Las Casas, Pocito, Mex., Sept. 4, 1937, H. D. Thomas," 6 males, 6 females. This is also in *Chiapas.*

PLATE XXIV

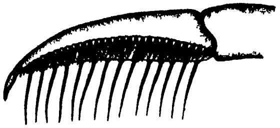
Neocorixa Hungerford

FIG. 1. *Neocorixa snowi* Hungerford; genital capsule of male.
FIG. 2. *N. snowi* Hungerford; pala of male.
FIG. 3. *Neocorixa picta* Hungerford; pala of male.
FIG. 4. *N. picta* Hungerford; genital capsule of male.
FIG. 5. *N. snowi* Hungerford; dorsal view of male abdomen.
FIG. 6. *N. picta* Hungerford; dorsal view of male abdomen.
FIG. 7. *N. snowi* Hungerford; ventral view of female abdomen.
FIG. 8. *N. picta* Hungerford; ventral view of female abdomen.

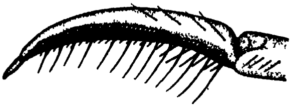
PLATE XXIV



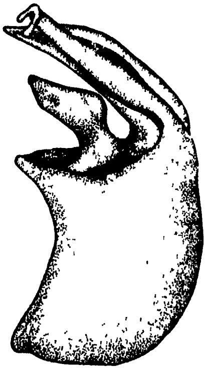
1 N snowi



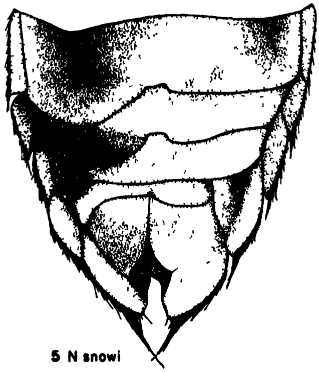
2 N snowi



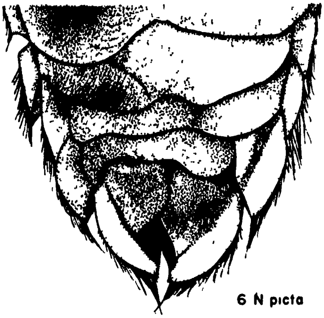
3 N picta



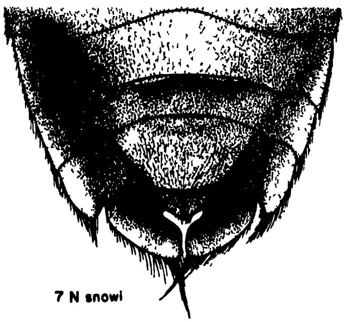
4 N picta



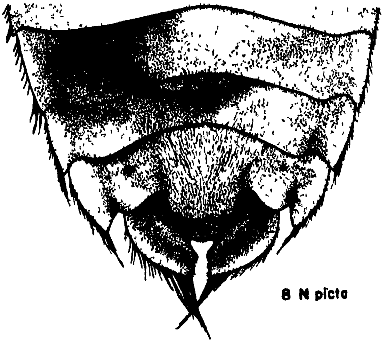
5 N snowi



6 N picta



7 N snowi



8 N picta

The GENUS GRAPTOCORIXA Hungerford

1930. Hungerford, H. B. Pan-Pacific Entomologist VII, pp. 22-23 [Genotype *Corixa abdominalis* (Say)].

1931. Jaczewski, T. Annales Musei Zoologici Polonici, IX, pp. 191-194.

1935. Poisson, R. Archives de Zoologie Experimentale et Générale, LXXVII, p. 458

1948. Walton, G. A. Trans. Soc. for British Entomology, VIII, p. 157. (As subg. of *Trichocorixa* Kirk.)

Surface of hemelytra rastrate or roughly rugulose, transversely marked with charactertistic undulate bands. Membranal line not marked, usually indistinct. Margin of hemelytra beyond embolar furrow maculated. Pruinose area on claval fold along clavus usually less than twice the distance between the shining basal apices of the corium and clavus. Face more or less hairy, often densely so, face usually reduced. Infraocular portion of head often very broad and postocular area moderately wide. Legs comparatively short and stout. Pala typically digitiform with well developed claw, which is often stout. The male pala with a row of pegs adjacent to the upper margin of the palm. Dorsum of abdomen often red. Male strigil dextral.

Genotype: *Corixa abdominalis* Say.

Comparative notes: The color pattern and the shape of the palae are distinctive. The only other genus having these characters is *Neocorixa* in which the male abdomen is sinistral and the female abdomen shows distinct asymmetry.

Distribution: This genus occurs in the western United States and southward to Costa Rica.

KEY TO GRAPTOCORIXA HUNGERFORD

1. Middle tarsus longer than its tibia, on moderately large or broad species with head width at least 2.6 mm 2

Middle tarsus subequal to tibia, if longer, then on small, rather slender, species. 4

2. (1) Prothoracic lateral lobe broader than long. Postocular space narrow. Distal half of rear margin of hind femur of the male with a close set row of stout pegs .... *G. rutna* Hungerford (p. 158)

Prothoracic lateral lobe not broader than long. Postocular space fairly broad. Hind femur of male not as above 3

3. (2) Prothoracic lateral lobe considerably longer than broad, the anterior distal angle almost acute .... *G. robusta* Hungerford (p. 159)

Prothoracic lateral lobe but little longer than broad, the anterior distal angle rounded .... *G. thomasi* Hungerford (p. 160)

4. (1) Prothoracic lateral lobe quadrate, if longer than broad, then of uniform width on species with a white spot on distal angle of corium 5

Prothoracic lateral lobe elongate 9

5. (4) Infraocular width of genae at level of the hypo-ocular suture as great as the diameter of the middle femur. Anterior femur of male conspicuously produced at inner base 6

Infraocular width of genae at level of the hypo-ocular suture narrower than the diameter of the middle femur. Anterior femur of male not conspicuously produced at inner base. 7

6. (5) White spot at distal angle of corium nearly always present. Basal segments of abdominal venter not often reddish. Middle femora lacking the row of pegs described for *G. abdominalis* . . . . . *G. bimaculata* (Guér.) (p. 162)

White spot at distal angle of corium absent. Basal segments of abdominal venter usually reddish. Middle femur of male with a close set row of short pegs on caudoventral margin. Middle femur of female with two or three rows of procumbent pegs on ventral surface . . . . *G. abdominalis* (Say) (p. 164)

7. (5) Prothoracic lateral lobe plainly broader than width of middle femur, its rear margin conspicuously shorter than distal margin. Anal lobes of female deeply notched on inner ventral margin 8

Prothoracic lateral lobe about equal to width of middle femur, its rear margin not conspicuously shorter than distal margin. Anal lobes of female shallowly notched on inner ventral margin. . *G. uhleri* (Hungfd.) (p. 169)

8. (7) Lower basal angle of anterior femur roundly but not greatly produced. Male right clasper broadest at basal third and pointed at tip
G. uhleroidea Hungfd. (p. 170)

Lower basal angle of anterior femur not produced. Male right clasper broadest at distal third and rounded at tip *G. californica* (Hungfd.) (p. 172)

9. (4) Infraocular portion of genae broad laterally as seen in cephalic view 10

Infraocular portion of genae narrowing laterally, the face appearing considerably reduced . . . . *G. emburyi* Hungfd. (p. 174)

10. (9) Rear margin of eyes nearly straight. Postocular space of uniform width or broadest at inner angle of the eye 11

Rear margin of eyes concave and head margin convex, making the postocular space broadest about the middle. Right penultimate lobe of abdomen of male with peg at outer base . . . . *G. serrulata* (Uhler) (p. 176)

11. (10) Front femur conspicuously angularly produced at inner base in male and slightly produced in female. Metaxyphus not distinctly longer than wide. Strigil of male minute . . . . *G. gerhardi* Hungfd. (p. 179)

Front femur not angularly produced at inner base. Metaxyphus distinctly longer than broad. Strigil not minute 12

12. (11) Prothoracic lateral lobe obliquely truncate, middle tarsus slightly longer than tibia 13

Prothoracic lateral lobe rounded at end, middle tarsus and tibia of equal length, or tarsus slightly shorter than tibia 14

13. (12) Male clasper as in drawing Plate XXVIII, fig. 3 *G. gentryi* Hungfd. (p. 180)

Male clasper as in drawing Plate XXVIII, fig. 4 *G. gentryi decora* Hungfd. (p. 181)

14. (12) Interocular space narrow, plainly less than width of eye as measured by projection. Female with distal margin of sixth ventral abdominal segment incised laterally . . . . *G. henryi* Hungfd. (p. 182)

Interocular space broad, equal to width of eye as measured by projection. Female with sixth ventral abdominal segment normal . *G. melanogaster* (Kirk.) (p. 183)

Graptocorixa ruina Hungerford

(Plate XXIX, figs. 2, 2a to 2e)

1938. *Graptocorixa ruina* Hungerford, H. B. Jl. Kans. Ent. Soc., XI, No. 4, pp. 139-140, p. 141, figs. 1, 2.

Size: Length 10.8 mm.; width across head, 3.2 mm.

Color: This teneral specimen cannot be used for any typical color picture. The pronotum is crossed by fifteen brown bars, slightly narrower than the intervening pale ones. The wavy barring of the hemelytra has the brown bands slightly broader. The distal angle of the clavus with one brown bar erased.

Structural characteristics: Male facial depression shallow, covered sparsely with a pile of fine white hairs, laterad of which is a patch of longer hairs half way between the angle of the eye and the base of the beak. The antennal segments: 1 : 2 : 3 : 4 :: 27 : 20 : 60 : 18. Prothoracic lateral lobe broad, the rear margin shorter than the distal and rounding into it. The anterior femur of the male somewhat collapsed in this type. It lacks a stridulatory patch of pegs on its base but has spines as shown in figure 2 on Plate XXIX. The pala is shown in the same figure with forty-four pegs, the basal end of the row doubled back on itself, the pegs in the middle of the row larger and more pointed than the others. The middle leg: femur : tibia : tarsus : claws :: 100 : 29.7 : 36.9 : 19.8; the middle femur is thickened on its distal half, the beginning of the thickened portion marked by a row of conspicuous long hairs; the middle tarsus distinctly longer than its tibia. The hind leg: femur : tibia: tarsus 1 : tarsus 2 :: 100 : 87.8 : 115.5 : 30.4. The caudoventral margin of hind femur with a row of eighteen pegs, their size increasing to the distal end of the row. Metaxyphus length to its width as 50 : 38. The right clasper of the male, the hind femur, the middle femur, the rear view of the pala and the abdominal dorsum as shown in Figures 2a, 2b, 2c, 2d and 2e on Plate XXIX. The strigil with four combs, protected on its right side by the strongly sclerotized overlapping fold of the connexivum. The anal lobes asymmetrical, the right one smaller with a thickened tuft of hairs on its inner margin, and the left lobe with two hooklike flaps extended from its inner dorsal margin and a notch in its inner ventral margin. The genital capsule is collapsed in the type.

Location of type: Holotype in the Francis Huntington Snow Entomological Collections and labeled "Arroyo Marcial, District Alamos, Son., Mexico, Oct. 28, 1934, H. S. Gentry." This specimen taken same date and place as the specimen of *G. robusta* Hungerford. (See Plate XXX.)

Comparative notes: The shape of the front femur of the male is like that of *G. thomasi* Hungerford and the modifications of the anal lobes and the shielded strigil also show a relationship to that species. It differs from *G. thomasi* Hungerford in having the prothoracic lateral lobe broader than long and in having a close set row of stout pegs on the rear margin of the hind femur.

Graptocorixa robusta Hungerford

(Plate XXIX, figs 1, 1a to 1c)

1938. *Graptocorixa robusta* Hungerford, H B. Jl Kans Ent Soc. XI, No. 4, pp 138-139 P. 141, figs 3, 7

Size: Length 6.6 mm. to 7.8 mm.; width across head 2.6 mm. to 2.94 mm. A strikingly robust species.

Color: General color dark, the dark bands typically black and the pale bands ivory white; the pronotum crossed by twelve or thirteen dark, narrow, somewhat broken, bands that are broader than the pale interspaces; the wavy cross bands of the hemelytra with the dark bands broader except at inner angle of the clavus and near the tip of the corium; on the latter region the dark bands more or less erased leaving an irregular pale area; across the midsection of clavus and corium the black bands three or four times as broad as the pale ones; on the membrane the pale bands broader; base, midsection and tip of embolium black; venter of thorax black with lighter margins; abdomen brown to blackish; the facial area dark brown, the pigment extending laterally below the eyes to the hypoocular suture and dorsally as a medium stripe between the eyes; the legs shining, dark brown except basal half of palae which are white, the middle tarsi, the distal half of first segment of hind tarsus and all of the second which are light brown.

Structural characteristics: Head as seen from above short and broad. Frontal depression of male rather shallow, covered with appressed pile of fine white hairs; female face not depressed and sparsely covered with fine white hairs. Antennal segments: 1 : 2 : 3 : 4 :: 28 : 18 : 48 : 22. Interocular space narrow, about three-fourths the eye width measured in projection; postocular strip widest at inner angle of the eyes. Prothoracic lateral lobe rather elongate and obliquely truncate. The anterior femur not produced at base, basal half pilose, this area margined distally with a transverse row of long spines above which is a short longitudinal row of short spines. The pala of the male elongate but longitudinally compressed into a thin strip, dorsally bearing beneath its inner margin a row of fifteen elongate pegs; the terminal claw moderately stout. See figures 1 and 1c on plate XXIX. The female pala typical for the genus. Middle and hind legs stout. The middle leg: femur : tibia : tarsus : claws :: 100 : 30 : 32.5 : 21.3. Thus the middle tarsus is a little longer than its tibia. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 83.3 : 128.5 : 30.9. Metaxyphus length to its width as 30 : 29, blunt at tip. The male genital capsule and abdominal dorsum as shown in figures 1a and 1b on plate XXIX. The strigil small, with four combs, and partially hidden by the recurved lateral margins of the sixth and seventh segments.

Location of types: Holotype, allotype and paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas. Described from three males and four females labeled "Acapulco, Guerrero, Mexico, July 14, 1937, H. D. Thomas." I have had for several years a teneral male labeled "Arroya S. Marcial, District Alamos, Son., Mexico, Oct. 28, 1934, H. S. Gentry," and a female labeled "Mexico, June, July, 1933, H. E. Hinton, Tejupilco, district of Temascaltepec, Alt. 1340 meters." The above nine specimens comprise the type series.

Comparative notes: This unique species agrees with *G. thomasi* Hungerford in having a relatively long middle tarsus and a male pala that digresses from the generic type. The rastrate surface, the color pattern of the hemelytra, the stout legs and the head characters are typically *Graptocorixa.* Its short, broad form distinguishes it.

Data on distribution: (Plate XXX) The type series showed a distribution in *Guerrero, Sonora* and *México,* states of Mexico. We have in addition the following from MEXICO: *Michoacán:* Chinapa, Sept. 5, 1938, H. D. Thomas, 2 males, 2 females; *México:* Tejupilco, Temascaltepec, June 16, 1933, Hinton and Usinger, 4 males, 2 females.

Graptocorixa thomasi Hungerford

(Plate XXVIII, figs 1, 1a and 1b)

1938. *Graptocorixa thomasi* Hungerford, H B. Jl. Kans Ent Soc, XI, No. 1, pp. 28-30, text figs. 1-3.

1938 *Graptocorixa thomasi,* Hungerford, H. B. Jl Kans. Ent. Soc., XI, No 4, p. 134.

Size: Length 9 mm. to 9.2 mm.; width across the head 3.1 mm. to 3.2 mm.

Color: General facies moderately dark. In one specimen only the venter of the prothorax is dark. In another the venter of the thorax and the basal abdominal segments are nearly black. Pronotum crossed by thirteen or fourteen dark bands that are, on the whole, slightly narrower than the pale interspaces. Corium and clavus crossed by transverse wavy bands; on the inner angle of the clavus the pale bands are broader than the dark ones. Elsewhere the reverse is true, except at the tip of the corium where there is an ill-defined pale area; the membrane is crossed by undulate bands; embolium sooty black.

Structural characteristics: Face somewhat narrowed but not as greatly reduced as in some species of the genus. Facial depression of the male very slight and but sparsely covered with hair. The antennal segments: 1 : 2 : 3 : 4 :: 30 : 18 : 55 : 20 (both sexes). Prothoracic lateral lobe but little longer than broad, the anterior distal angle rounded. The anterior femur of the male conspicuously and angularly produced near the middle of the caudal margin; on the inner surface at this point is a transverse ridge, from the distal side of which are five stout curved bristles. No patch of stridulating pegs on femur. The anterior femur of the female of nearly uniform diameter; near the middle the caudal margin is produced and bears a row of four or five long bristles. The pala of the female typical for the genus; the pala of the male as shown in figure 1 on plate XXVIII, its peculiar shape making this a readily recognized species. There are about fourteen pegs in the upper row and thirty-two pegs along the upper margin of the palm. The middle leg: femur : tibia : tarsus : claws :: 100 : 26.7 : 36.6 : 19.8; the tarsus conspicuously longer than the tibia. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 82.3 : 114.6 : 30.4; the tibia with anterior margin distally produced and spine-tipped; the first tarsal segment relatively broad. Metaxyphus length to its width as 43 : 34. The dorsal side of the male abdomen as shown in figure 2 on Plate XXVIII; the caudal lobes of the abdomen have the inner margins curiously modified into broad, more or less hooklike structures; the strigil consists of two combs. The genital capsule as shown in figure 1b, Plate XXVIII.

Location of types: Holotype, allotype and one paratype (male) in Francis Huntington Snow Entomological Museum, University of Kansas. They are labeled "El Sabino, Uruápan, Mich., Mexico, Aug. 2, 1936, H. D. Thomas."

Comparative notes: The elongate middle tarsus and the unique shape of the male pala readily characterize this species.

Data on distribution: (Plate XXX) Known only by the types from *Michoacán, Mexico.*

Graptocorixa bimaculata (Guérin)

(Plate XXV, figs 2, 2a to 2d)

1844. *Corixa bimaculata* Guérin-Méneville, F. E. Icon. du Règne Animal . . . (Insects), p. 354.

1851 *Corixa bimaculata* Guérin, Fieber, F. X. Species Generis Corisa, p. 42.

1876. *Corixa bimaculata*, Uhler, P. R. Bull. U. S. Geol. Geog. Survey 1, p. 340. (Places as syn. of *C. abdominalis* Say)

1876 *Corixa bimaculata*, Uhler, P. R. List of Hemiptera of Region West of the Mississippi River. (Reprint from above bulletin separately paginated. P. 74.)

1901. *Corixa abdominalis*, Champion, G. C Biol Centr Am. Heter. II, p. 381, Pl. 22, fig. 25. (Treated *C. bimaculata* Guér. as syn in error)

1909. *Arctocorisa bimaculata*, Kirkaldy, G. W , and Torre-Bueno, J. R de la. Catalogue in Proc Ent. Soc. Wash., X, p. 194. [As syn. of *A. abdominalis* (Say)]

1917 *Arctocorixa bimaculata*, Van Duzee, E. P. Catalogue of Hemiptera, p. 478. [As syn. of *A. abdominalis* (Say).]

1929. *Sigara abdominalis bimaculata*, Lundblad, O. Ento. Tidskrift, L., Haft 1, pp. 42-46, Figs. 17-18, Pl. V, fig. 8

1930 *Graptocorixa abdominalis bimaculata*, Hungerford, H B. Pan-Pacific Ent., VII, No. 1, p. 23.

1938. *Graptocorixa bimaculata*, Hungerford, H. B. Pan-Pacific Ent., XIV, No. 2, p. 76.

1938 *Graptocorixa bimaculata*, Hungerford, H. B Jl. Kans Ent. Soc., XI, No 4, p. 134 [Distinct from *G abdominalis* (Say).]

Size: Length 8.4 mm. to 10.1 mm. Width across the head 2.8 mm. to 3.36 mm.

Color: Characterized by a crescentic or round white spot in a black field at the distal angle of the corium of each hemelytron, suggesting the name "bimaculata," and abdomen not sanguineous, otherwise as in *G. abdominalis* (Say).

Structural characteristics: Beak reduced, infraocular width of genae at level of the hypo-ocular suture as great as the diameter of the middle femur. Face even in the male not depressed but with three longitudinal grooves covered with more or less dense hair mat. Antennal segments: 1 : 2 : 3 : 4 :: 40 : 21 : 58 : 20 ♂ ; 1 : 2 : 3 : 4 :: 40 : 22 : 58 : 25 ♀. Pronotum moderately rugulose. Hemelytra strongly rastrate. Front femur angulate at inner base, conspicuously so in the male which has a triangular stridulatory patch of pegs and below it 3 or 4 tufts of stout spines followed by longer spines. The pala of the male as shown in figures 2 and 2b on plate XXV. The middle femur of male lacking the peg row that characterizes *G. abdominalis* (Say), but having the row of long hairs; the middle femur of the female lacking the peg rows described for *G. abdominalis* (Say). (See figs. 2c and 2d on Plate XXV.) Middle leg: femur : tibia : tarsus : claws :: 100 : 35 : 33 : 25. Hind leg: tibia : tarsus 1 : tarsus 2 :: 100 : 94.1 : 125.3 : 39.4.

Metaxyphus length to its width as 34 : 27. The eighth abdominal lobes of female not notched on their inner ventral surface. The male genital capsule and abdominal dorsum as shown in figures 2a and 2e on Plate XXV.

Location of types: Two males in the Paris Museum bear the label "Museum Paris. Coll. Guérin-Ménév. ex coll. A Salle 1897." "Mexique" One is marked type. I examined the other specimen and it is what I have known as this species.

Comparative notes: This species has long been confused with *G. abdominalis* (Say) from which it can be readily separated in both sexes. There never has been any difficulty in sorting out typically marked specimens of *G. bimaculata* (Guérin) with the conspicuous white spot at the tip of the corium. However, perplexity arose when we encountered specimens of *G. bimaculata* (Guérin) with the white spots greatly reduced or specimens of *G. abdominalis* (Say) in which the pale bars at the tip of the corium became confluent, resulting in pale spots. Plate XXV shows differences in the male pala, in the right genital claspers and in the middle femora. *G. abdominalis* (Say) has a row of stout pegs on the femur of the male and two or three rows of procumbent pegs on the ventral surface of the femur of the female. These are lacking in *G. bimaculata* (Guérin).

Data on distribution: (Plate XXX) The following records have been published: Guatemala (as *abdominalis* by Champion) 1901; Mexico, 1929; Colima, Vulcano, Mexico, 1930; Guatemala, 1930; Costa Rica, 1930; Oaxaca, Mexico, 1938; Mexico, 1944. The following material has been examined in connection with this study:

COSTA RICA: Baker (U. S. N. M.).

GUATEMALA: (C. F. Baker Col.)

MEXICO: *Oaxaca:* Mitla, May 2, L. O. Howard (U. S. N. M.); 5,000 ft. el. semidesert, semitropical, Aug. 20, 1937, Meldon Embury (13 males, 18 females); Oaxaca, Aug. 25, 1937, H. D. Thomas (11 males, 50 females); near Chasumba, July 28, 1932, Hobart Smith (1 female).

Veracruz: Orizaba, July 30, 1937, H. D. Thomas (1 female).

Guerrero: Salto de Valadez, 325 klm. s. of Mex. City, Oct. 30, 1936, H. D. Thomas (1 female).

Michoacán: 10 mi. down Chinapa Road, Sept. 5, 1938, H. D. Thomas (9 males, 14 females); Morelia, Sept. 4, 1938, H. D. Thomas (1 male, 2 females) (*G. abdominalis* taken also); Zamora, Sept. 9, 1938, H. D. Thomas (1 female); Carapa, Sept. 8, 1938, H. D. Thomas (2 females); Pátzcuaro, Aug. 31, 1938, H. D. Thomas (1 female); Tancítara, Aug. 8, 1940, F. Schacht (1 male, 1 female).

Colina: Vulcano, L. Conrad (U. S. N. M.) (2 males).

Jalisco: Chapala, Sept. 11, 1938, H. D. Thomas (23 males, 45 females), (*G. abdominalis* taken at same time); Guadalajara, Tequilla Rd. 28 mi. N. of Jalisco, Sept. 13, 1938, H. D. Thomas (29 males, 30 females); Unión de Tula, Sept. 16, 1938, H. D. Thomas (1 female); Tecolotlan, Sept. 15, 1938, H. D. Thomas (13 males, 26 females); Corriente, Aug. 24, 1937, H. D. Thomas (1 female); 15 mi. s. w. of Lake Chapala, Sept. 14, 1938, H. D. Thomas (4 males, 11 females); 15 klm. west of Jalapa, July 18, 1937, H. D. Thomas (1 male).

Aguascalientes: Aug. 9, 1944, H. D. Thomas (2 males, 3 females), [taken with *G. abdominalis* (Say)].

Puebla: Near Zapatillan, July 26, 1932, Hobart Smith (1 male, 6 females); July 14, 1937, H. D. Thomas (1 male); Tehuacan, Aug. 25, 1937, H. D. Thomas (4 females).

Mexico: Tejupilco, Temescaltepec, June 24, 1933, Hinton and Usinger (Calif. Acad.), (1 male in K. U. Col.).

D. F.: Lake Texcoco, July 26, 1937, H. D. Thomas.

Morelos: Tepoztlan, Aug. 1, 1938, L. Lipovsky (1 male, 2 females); July 14, 1936, H. D. Thomas, 12 males, 9 females); Cuernavaca, Oct. 1, 5, 6, 17, 1936, H. D. Thomas (130 males, 130 females); Cuernavaca, Aug. 20-26, 1929, G. Lassman (1 female); Cuernavaca, May 16, 1898, (Ball Coll. in U. S. N. M.) (4 males, 5 females); Cuernavaca, Aug. 16, 1944, N. L. H. Klauss (U. S. N. M.) (1 female); Mazatepec, April 29, 1944 J. C. Shaw, (1 male, 2 females).

Graptocorixa abdominalis (Say)

(Plate XXV, figs. 1, 1a to 1d; wash drawing No. 38, Plate VI)

1832. *Corixa abdominalis* Say, Thomas. Heteroptera New Harmony, p. 38.

1851. *Corixa abdominalis*, Say, Fieber, F. X. Species Generis Corisa, p 42.

1857. *Corixa abdominalis*, Say, Thomas. Fitch Reprint, p. 811, *in* Trans. N. Y. State Agri Soc., XVII.

1869. *Corixa abdominalis*, Say, Thomas. Complete Writings I (ed. by Le Conte), pp. 366-367.

1876. *Corixa abdominalis*, Uhler, P. R. Bull. U. S. Geol. Geog. Survey I, p. 340 (Dist. Cal -Tex.).

1876. *Corixa abdominalis*, Uhler, P. R. List of Hemiptera of Region West of the Mississippi River. (Reprint from above Bulletin, separately paginated, p. 74.)

1894. *Corisa abdominalis*, Uhler, P. R. Proc. Calif. Acad. Sci. (ser. 2) IV, p. 294 (Dist: Lower California).

1909. *Arctocorisa abdominalis*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue in Proc. Ent. Soc. Wash. X, p. 194 (in part).

1917. *Arctocorixa abdominalis*, Van Duzee, E. P. Catalogue of Hemiptera, p. 478 (in part).

1922. *Arctocorixa abdominalis*, Hungerford, H. B., and Moore, R. C. Kans. Univ. Sci. Bull. XIV, p. 417, (Record Utah).

1925. *Arctocorixa abdominalis*, Hungerford, H. B. Bull. Brook. Ent. Soc. XX, p. 21 (*C. femorata* Guérin not a syn.).

1928. *Arctocorixa abdominalis*, Hungerford, H. B. Annals Ent. Soc. Amer. XXI, p. 141 (Dist. Note).

1929. *Corixa abdominalis* Say, Hungerford, H. B. Pan-Pacific Ent. VI, No. 2, p. 73.

1930. *Graptocorixa abdominalis*, Hungerford, H. B. Pan-Pacific Ent. VII, No. 1, p. 22. (Type of new genus.)

1931. *Arctocorixa abdominalis*, Torre-Bueno, J. R. de la. Bull. Brooklyn Ent. Soc. XXVI, No. 3, p. 188. (Records Alpine, Tex.)

1931. *Graptocorixa abdominalis*, Jaczewski, T. Annales Musei Zool. Polonici, IX, No. 15, p. 191, Pl. XXV, fig. 1, (Mex. D. F. Tizapan, Jalisco)

1933. *Graptocorixa abdominalis*, Ancona, H. L. Anales del Instituto de Biologia T. IV, No. 1, p. 53.

1938. *Graptocorixa abdominalis*, Hungerford, H. B. Jl. Kans. Ent. Soc. XI, No. 4, p. 134. [Distinct from *G. bimaculata* (Guér.)]

1939. *Arctocorixa abdominalis*, Millspaugh, Dick. D. Field and Lab., VII, No. 2, p. 83.

Size: Length 8.55 mm. to 10.8 mm. Width across the head 2.8 mm. to 3.5 mm. The average length being 10 mm.

Color: General facies dark. Abdomen typically sanguineous on basal segments both dorsally and ventrally. Pronotum crossed by 12 to 16 dark bands, the anterior ones broader than the others which are slender and often broken. The transverse bands of the hemelytra more or less undulate, the dark bands broader than the light ones. Face, thoracic venter, distal end of abdomen, distal half of pala, distal end of femur, tibia and tarsus of middle legs, distal end of first tarsal segment and all of the second tarsal segment of hind leg embrowned to black.

Structural characteristics: Beak reduced, infraocular width of genae at level of the hypo-ocular suture as great as the diameter of the middle femur. Face even in the male not depressed but with three longitudinal grooves covered with more or less dense hair mat. Antennal segments: 1 : 2 : 3 : 4 :: 38 : 22 : 50 : 28 ♂ ; 1 : 2 : 3 : 4 :: 38 : 22 : 52 : 33 ♀. Pronotum moderately rugulose. Hemelytra strongly rastrate. Front femur angulate at inner base, conspicuously so in male which has a triangular stridulatory patch of pegs and below it three or four tufts of stout spines followed by a row of longer spines. The pala of male as shown in figures 1 and 1b on Plate XXV. The middle femur of male with a close set row of short pegs on caudoventral margin, the middle femur of female with two or three rows of procumbent pegs on ventral surface. (See figures 1c and 1d on Plate XXV.) Middle leg: femur : tibia : tarsus : claws :: 100 : 36 : 30.4 : 20.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100: 93.5 : 116.9 : 35.1. Metaxyphus length to its width as 34 : 27. The eighth abdominal lobes of female not notched on their inner ventral surface. The male genital capsule and abdominal dorsum as shown in figures 1a and 1e on Plate XXV.

Location of types: The Say types have been lost. Say described the species from material "found in Mexico by William Bennett and sent me by Mr. Maclure." A neotype is here designated. It bears the label "Tlalpan, D. F. Mexico, 11-3-1936, H. D. Thomas" and is deposited in the Francis Huntington Snow Entomological Museum, University of Kansas.

Comparative notes: This species Say characterized as having "abdomen sanguineous at base." While this is very striking on many specimens, perhaps the majority, it is not a universal marking. The basal segments may be only faintly orange instead. Its closest relative is *G. bimaculata* (Guérin) from which it may be separated readily by the key and the figures on Plate XXV.

Data on distribution: (Plate XXX.) The following records have been published: *Mexico,* 1832; *California* and *Texas,* 1876; *Lower California,* 1894; Kane Co., *Utah,* 1922; Superstition Mts., *Arizona,* 1925; Sutton Co., Presidio Co., Culberson Co., Valentine and Alpine, *Texas;* Organ Mts., *N. M.;* Catalina Mts., Sabino Basin in Catalina Mts., Hot Springs, Warsaw, Superstition Mts., Quartzside, Cochise Co., Gila Co., Yavapai Co., Santa Cruz Co., Oracle, Yuma Co., *Arizona;* Palo Verde, Imperial Co., *California;* Espíritu Santo Island, *Gulf of California,* 1930; Alpine, *Texas,* 1931; Tizapan, *Mexico,* D. F., 1931.

The following material has been examined in connection with this study:

MEXICO: *Michoacán:* Morelia, Sept. 4, 1938, H. D. Thomas (*G. bimaculata* taken at same time); Zacapu, Sept. 1, 1938, H. D. Thomas (1 female).

Jalisco: Chapala, Sept. 11, 1938, H. D. Thomas (6 males, 5 females), (*G. bimaculata* taken at same time); Tecolotlan, Sept. 15, 1938, H. D. Thomas (1 male); 15 km. west of Jalapa, July 18, 1937, H. D. Thomas (4 males, 5 females).

Sonora: Conejos Dist. Alamos, Oct. 26, 1934, H. S. Gentry (14 males, 19 females).

Lower California: Triunfo, July 7, 1938, Michelbacker and Ross (1 male and 1 female); El Paraiso, Chas. D. Haines, May, 1889 (1 male) (Uhler Coll.).

Chihuahua: July 14, 1938, L. Lipovsky (9 females); San Louis Babarocos, Dec. 30, 1934, H. S. Gentry (7 males, 8 females); Carimechi, Río Mayo, Dec. 12, 1934, H. S. Gentry (2 females, and Jan. 6, 1935, 1 male, 1 female).

Aguascalientes: Aug. 9, 1944, H. D. Thomas, 14 males, 8 females (taken with *G. bimaculata* Guér).

Guanajuato: 10 miles N. E. León, Aug. 17, 1932, Hobart Smith; Saltillo, H. D. Thomas (3 males, 3 females).

San Luis Potosí: 20 miles west of, Aug. 8, 1944, H. D. Thomas, 5 males, 10 females; Aug. 4 and 5, 1944, H. D. Thomas, 50 males, 26 females.

Coahuila: Buena Vista, el. 7,000 ft. Sierra del Carmen, July 7, 1938, Rollin H. Baker; Cañon del Hillcoat, el. 7,000 ft. Sierra del Carmen, July 10, 1938, Rollin H. Baker (2 males, 4 females).

Puebla: Puebla, July 24, Aug. 16, 1937, H. D. Thomas (36 males, 33 females).

Districto Federal: Tlalpan, Nov. 3, 1936, H. D. Thomas; México, "Ahuautlea Mexicana," 1 male (U. S. N. M.); México, W. H. Ashmead (1 male) (U. S. N. M.).

U. S. A.: *California:* Palo Verde, Dec. 30, 1929, Desert Tank, E. R. Hall; Monterrey (U. S. N. M.) (3 females).

Utah: S. E. Kane Co., 1921, R. C. Moore.

Arizona: C. U. (1 female) (Uhler Col.); Hot Springs, Barber and Schwarz (3 females) (U. S. N. M.); Quartzsite (3 males, 4 females); Yuma Co. (E. P. Van Duzee); Santa Catalina Mts., Sabino Basin, Oct. 3, C. H. Townsend (1 male); Santa Catalina Mts., Nov. 20, 1933, Bryant (Bryant Col.); Santa Catalina Mts., No. 33-403, Bryant (Bryant Col.); Cienega Creek, near Pantano, Alt. 3,200 ft., Mar. 12, 1932, D. K. Duncan (1 male); Cienega Creek, near Pantano, Alt. 3,200 ft., March 12, 1932, D. K. Duncan (Lutz); Baboquivari Mts., Oct., 1934, Frank Blanchard (4 males, 3 females); same place, F. H. Snow (6 males, 10 females); same place, 1937, W. Benedict (2 males, 2 females); same place, July 16, 1932, R. H. Beamer, Jr. (3 males, 12 females); same place, July 18, 1932, R. H. Beamer (1 male, 3 females); Sabino Canyon, July 14, 1932, J. D. Beamer (1 male); Tucson, March 15, 1916, Sabino Canyon (Parshley); Tucson, 1935, Owen Bryant, No. 55 (Bryant); Lepache Lake, March 10, 1932, D. K. Duncan (Lutz); Bear Canyon, Santa Catalina Mts., Jan. 2, 1938, E. C. Van Dyke (Calif. Acad. Sci.); Santa

Cruz Co., Aug. 4, 1927, P. A. Readio and R. H. Beamer (1 male, 2 females); Santa Cruz Mts., July 17, 1932, and June 12, 1933, R. H. Beamer (3 females); Santa Rita Mts., March 23, 1933, Bryant (Bryant Col.); same place, July 17, 1932, R. H. Beamer (2 females); same place, June 12, 1933, R. H. Beamer (2 females); same place, July 19, 1938, D. W. Craik (1 female); Chiricahua Mts., July 8, 1932, R. H. Beamer (3 males, 1 female); same place, July 5, 1940, L. C. Kuitert (1 female); same place, July 14, 1938, D. W. Craik (1 female); same place, Owen Bryant (Bryant Col.); Huachuca Mts., July 8, 1932, R. H. Beamer (6 males, 10 females); Cochise Co., July 29, 1927, L. D. Anderson, R. H. Beamer (8 males, 2 females); Superstition Mts., Nov. 7, 1922, P. A. Glick (9 males, 3 females); Warsaw, Dec. 4, 1893 (1 female) (U. S. N. M. acc. 28058); Oracle, 14 mi. east, July 27, 1924, J. O. Martin (Calif. Acad. Sci.); Tortillita Mts., Owen Bryant, No. 33-53 (Bryant); Foxborough Ranch, Owen Bryant, No. 36-93 (Bryant); Gila Co., Aug. 5, 1927, R. H. Beamer (4 males, 6 females); same place, Aug. 6, 1927, P. A. Readio (1 male); Globe, Duncan (Calif. Acad. Sci.); Superior, Mar. 21, 1933, Bryant (Bryant Col.); Miami, July 22, 1932, R. H. Beamer (1 male); Yavapai Co., Aug. 9, 1927, P. A. Readio and L. D. Anderson (3 males, 3 females); Santa Rita Mts., July 26, 1925, (U. S. N. M.) (2 males, 1 female); Huachuca Mts. (U. S. N. M.) (2 males, 1 female); same place, 5,150 ft., March 16, 1919, R. D. Camp, (1 male, 2 females); Pima Co., Catalina Mts., Aug. 6, 1930, L. K. Gloyd (Mich. Coll.) (1 female).

New Mexico: Silver City, July 22, 1936, J. D. Beamer (1 male); Messila Park, July 18, 1927, L. D. Anderson (2 females); Organ Mts., La Cueva, Alt. 5,300 ft., Townsend (1 female) (U. S. N. M.); Wagonmound, July 18, 1936, M. B. Jackson.

Texas: Jeff Davis, July 19, 1933 (1 male, 1 female); Davis Mts., July 12, 1938, D. W. Craik (1 male, 1 female); Alpine, Feb. 27, G. P. Englehardt (6 males, 6 females); Sutton Co., July 20, 1928, R. H. Beamer (3 males, 6 females); same place and date, J. G. Shaw (1 male, 2 females); Presidio Co., July 16, 1927, P. A. Readio (2 females); Culberson Co., July 14, 1928, W. Benedict (9 males, 14 females); Valentine, July 12, 1938, D. W. Craik (16 males, 12 females); same place, July 13, 1938, R. H. Beamer (4 males, 5 females); Brownsville, Esper Ranch (U. S. N. M.) (1 male); Ft. Davis, 1914, C. Thompson (3 females); Boat Springs, Chisos Mts., 7,000 ft., July 20, 1928, F. M. Gaige (U. S. N. M.) (3 males, 3 females).

Oklahoma: Kenton, Cimmaron Co., July 15, 1926, T. H. Hubbell (Hubbell Coll.) (4 males, 5 females).

Nevada: Washoe Co., Grass Valley Springs, Aug. 31, 1939, C. L. Hubbs (Mich. Coll.) (2 females).

Graptocorixa uhleri (Hungerford)

(Plate XXVI, figs. 2, 2a and 2b)

1925. *Arctocorixa uhleri* Hungerford, H. B. Bull Brooklyn Ent. Soc , XX, p. 19, pl. II, fig. 9.

1930. *Graptocorixa uhleri*, Hungerford, H. B. Pan-Pacific Ent., VII, No 1, p 22.

1938. *Graptocorixa uhleri*, Hungerford, H. B. Jl. Kans. Ent. Soc., XI, No. 4, p. 136.

Size: Length 7.98 mm. to 9 mm.; width across the head 2.48 mm. to 2.75 mm.

Color: General color medium to light above due to the broad pale yellow bands on pronotum and clavus. Yellow bands of pronotum often twice as wide as the black which are slender, somewhat furcate, uneven and about twelve in number. Clavus and corium crossed by continuous wavy bands. Membrane covered throughout by irregular zigzag yellow lines. The pattern on corium and membrane usually continuous without a line of demarcation. Embolium pale except for sooty to black patch on nodal furrow, margin beyond furrow checkered. Thoracic sternites, coxae, trochanters and base of femora black. Abdominal venter yellow to black, its dorsum basally may be sanguineous. Head and most of legs yellow, the dorsal side of middle femora and hind tibiae with dark longitudinal streak.

Structural characteristics: Beak reduced; infraocular width of genae at level of the hypo-ocular suture narrower than the diameter of the middle femur. Face provided with large dense patch of long silvery hair. Antennal segments: 1 : 2 : 3 : 4 :: 30 : 20 : 48 : 30 ♂, and 30 : 20 : 53 : 30 ♀. Prothoracic lobe about equal to width of hind femur, its rear margin not conspicuously shorter than its distal margin. The lower basal angle of anterior femur not conspicuously produced; the male with a tuft of hairs in place of a patch of pegs; three or four transverse rows of bristles, the basal ones short, the distal ones long on the base of the femur; the pala of the male slender, shaped as in *G. californica* (Hungerford) but provided with twenty-five or twenty-six pegs only. (See Plate XXVI, fig. 2.) Middle leg: femur : tibia : tarsus : claw :: 100 : 37.7 : 35.5 : 25.5. Hind leg: femur : tibia : tarsus : tarsus 2 :: 100 : 91 : 109.2 : 32.8. Metaxyphus length to its width as 30 : 21. The eighth abdominal lobes (anal lobes) of female shallowly notched on their inner ventral margin. The male genital capsule and abdominal dorsum as shown in figures 2a and 2b, plate XXVI. The strigil large, circular, with the combs very irregular.

Location of types: Described from four specimens in the Uhler collection at Washington bearing the label "San Bernardino, Calif." Holotype and allotype in the United States National Museum at Washington, D. C. Paratypes in the Francis Huntington Snow Collections, University of Kansas.

Comparative notes: Smaller than *G. californica* (Hungerford) and lighter in color; rastrations on tegmina less marked; strigil of male relatively larger and claspers of different shape. The anal lobes of female not deeply notched as they are in *G. californica* (Hungerford).

Data on distribution: (Plate XXX.) Besides the types we have studied the following:

California: San Diego Co., July 4, 1929, L. D. Anderson (5 males, 7 females); San Diego Co., July 28, 1929, P. W. Oman (2 females); Pine Valley, July 27, 1938, D. W. Craik (2 females); Warner Springs, July 28, 1938, R. I. Sailer (1 female); Descanso, Aug., 1914, W. S. Wright (1 female); Ventura Co., Aug. 12, 1916, E. O. Essig (2 males, 1 female) (Usinger Col.); Santa Cruz Isld., May 18, 1919, E. P. Van Duzee (1 male); Santa Cruz Isld., Santa Barbara Co., July 27-31, 1915, C. H. Kennedy (1 male, 3 females); Nipoma, San Luis Obispo Co., July 24, 1935, Jack and R. H. Beamer (12 males, 20 females); San Bernardino Co., Mohave R., Aug. 31, 1934, C. L. Hubbs (Mich. Coll.) (1 male, 2 females); Santa Barbara Co., June 13, 1916, C. L. Hubbs (Field Mus. Coll.) (1 male, 1 female).

Nevada: (Uhler Coll.) (U. S. N. M.) (2 males, 2 females).

Graptocorixa uhleroidea Hungerford

(Plate XXVI, figs. 3, 3a to 3b)

1938. *Graptocorixa uhleroidea* Hungerford, H. B. Jl. Kans. Ent. Soc, XI, No. 4, pp. 135-136. P. 141, fig. 8.

Size: Length 9.3 mm. to 10 mm.; width across head 2.7 mm. to 3.1 mm.

Color: General color dark above; abdominal dorsum more or less red, the caudal end dark to black; sternum black; venter of abdomen yellow in females to nearly black in some males; head and legs yellow except basal third of hind femora which are brown. Pronotum crossed by fourteen to sixteen dark bands that are somewhat irregular and incomplete and about as wide as the intervening pale lines. The hemelytra crossed by wavy bands, the dark ones wider than the light ones except at the base of the clavus; at distal end of corium the dark bars usually interrupted or erased to produce a small irregular pale area; the wavy barring of the membrane more or less complete; basal half of embolium pale; irregular sooty patch at nodal furrow, most of embolar margin checkered.

Structural characteristics: The so-called beak reduced. The infraocular width of genae at level of the hypo-ocular suture narrower than the diameter of the middle femur. Frontal depression of male oval, not reaching the eyes and the area in both sexes covered with a dense patch of long silvery hair. Antennal segments: 1 : 2 : 3 : 4 :: 32 : 20 : 60 : 32 ♂ ; 1 : 2 : 3 : 4 :: 35 : 22 : 63 : 35 ♀ . Faint median longitudinal carina on pronotum more distinct in anterior portion. Prothoracic lateral lobe plainly broader than the width of middle femur, its rear margin conspicuously shorter than distal margin. The lower basal angle of anterior femur roundly but not greatly produced; with a tuft of long bristles on anterior face of produced portion in both sexes. In one entire series from Monrovia Canyon, California (Mar. 2, 1930), the males have shed these spines, leaving three or four rows of lunate sockets where the bristles stood. Pala of the male as shown in figure 3 on Plate XXVI; long and slender, slightly curved and ending in a stout claw; a row of thirty-three pegs extending from the base to tip. Middle and hind legs stout. Middle leg: femur : tibia : tarsus : claws :: 100 : 38 : 34.2 : 18.1. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 95.2 : 113.6 : 33.4. Metaxyphus length to its width as 34 : 28. The eighth abdominal lobes (anal lobes) of female deeply notched on inner ventral margin. The male genital capsule and abdominal dorsum as shown in figures 3a and 3b on Plate XXVI. The strigil of male large, straight on inner margin, rounded on outer margin; about twelve combs, outer ones short. The male genital capsule with right clasper broader on basal half and left clasper more pointed than in *G. uhleri.*

Location of types: Holotype, allotype and paratypes in Francis Huntington Snow Entomological Collection, University of Kansas. Described from 19 males and 21 females labeled "Monrovia Canyon, California, March 2, 1930, C. H. Martin."

Comparative notes: The name is suggested by the similarity of the male clasper to that of *G. uhleri* Hungerford. The species in other respects is near *G. californica* (Hungerford) from which it differs by having the base of the anterior femora definitely but not greatly produced at base.

Data on distribution: (Plate XXX) Besides the type series, we have the following records:

California: Mission Creek, Santa Barbara, 1915, C. H. Kennedy, 8 males, 3 females (Cornell); Alpine, July 2, 1929, Paul W. Oman, 1 male; Bautista Can., April 8, 1931, C. H. Martin, 1 male; San Diego Co., July 4, 1929, L. D. Anderson and P. W. Oman, 4 males, 3 females; Pine Valley, July 27, 1938, D. W. Craik, 10 males, 8 females; Yuba Co., Camp Beale, Jan. 22, 1944; Eugene Ray (Field Mus. Coll.) (1 male, 1 female).

Graptocorixa californica (Hungerford)

(Plate XXVI, figs. 1, 1a and 1b)

1925. *Arctocorixa californica* Hungerford, H. B. Bull. Brooklyn Ent Soc., XX, p 18, Pl. II, fig. 10.

1930. *Graptocorixa californica,* Hungerford, H. B. Pan-Pacific Ent., VII, No. 1, p. 22.

Size: Length 8 mm. to 10.5 mm.; width across head 2.5 mm. to 3.2 mm.

Color: General facies dark; thoracic venter brown to black; abdominal venter yellow to nearly black in some males but not reddish as in *G. abdominalis* (Say); abdominal dorsum may be sanguineous. Pronotum, clavus and corium strongly rastrate, surface appearing rough. Pronotum crossed by about eighteen pale lines that are somewhat irregular and incomplete and about as wide as the intervening dark lines; clavus and corium crossed by parallel, continuous, wavy lines; those at base of clavus broadest, those at middle of clavus somewhat broken; membrane provided throughout with short, slender, undulate, pale lines; basal half of embolium pale; irregular sooty patch at nodal furrow, most of margin checkered. Prosternum and coxae more or less dusky.

Structural characteristics: Beak reduced; infraocular width of genae at level of the hypo-ocular suture narrower than the diameter of the middle femur. Face in both sexes with a large dense patch of long silvery hair. The head is usually yellow in color, but the area beneath the large mat of hair is usually dark. Antennal segments: 1 : 2 : 3 : 4 :: 40 : 21 : 60 : 31 ♂; 1 : 2 : 3 : 4 :: 38 : 21 : 57 : 31 ♀. Eyes, frons and pronotum more strikingly defined in male than in female. Faint median longitudinal carina on pronotum, more distinct in anterior portion. Prothoracic lateral lobe plainly broader than width of middle femur, its rear margin conspicuously shorter than its distal margin. The lower basal angle of anterior femur not produced; the male with a tuft of hairs in place of a patch of pegs; four transverse rows of bristles, the first short bristles, the others long bristles on the base of the femur; the pala of the male as shown in figure 1, Plate XXVI, long and slender, its base no broader than tibia to which it is attached and tapering to tip which is provided with a stout claw; the male pala more slender than that of female and provided on its inner base (which is exceedingly narrow) with a row of thirty-two pegs extending from base to tip. Middle leg: femur : tibia : tarsus : claw :: 100 : 37.8 : 33.3 : 18.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 98 : 125.6 : 44.7. Metaxyphus length to its width as 30 : 23. The eighth abdominal lobes (anal lobes) of female deeply notched on their inner ventral margin. The male genital capsule and abdominal dorsum as shown in figures 1a and 1b on plate XXVI. The strigil of male quadrate, with twelve combs.

Location of types: This species was described from eighteen specimens from California. Holotype, allotype and some paratypes in Francis Huntington Snow Collections, University of Kansas. Paratypes in Stanford University, United States National Museum, and the private collection of J. R. de la Torre-Bueno.

Comparative notes: This species is much like *G. abdominalis* (Say). The palae in both sexes are more slender and the surface of the pronotum and hemelytra more rastrate. Its closest relatives are *G. uhleroidea* Hungerford and *G. uhleri* (Hungerford) from which it differs as stated in the key on page 157.

Data on distribution: (Plate XXX). Besides the type series, one of which is labeled "Fresh running water," we have studied the following:

California: Pine Valley, San Diego Co., July 27, 1938, R. I. Sailer (4 nymphs); Descanso, San Diego Co., Aug. 7, 1914, J. C. Bradley (2 males, 2 females); San Jacinto Mts., Riverside Co., July 21, 1929, P. W. Oman (1 female); Indio, July 24, 1929, P. W. Oman (1 female); Pasadena, Los Angeles Co., Febr. (2 females); Bautista Canyon, July 5, 1931, C. H. Martin (1 female); Santa Barbara, July 7, 1907 (Drake); Atascadero, July 19, 1933, R. H. Beamer (4 males, 23 females); Jamesburg, Monterey Co., Aug. 11, 1938, D. W. Craik (17 males, 16 females); Giant Forest, Tulare Co., July 28, 1929, L. D. Anderson (1 male, 3 females); Sequoia Nat'l Pk., Aug. 6, 1940, L. C. Kuitert (1 female); Lone Pine, Inyo Co., Aug. 28, 1940, L. C. Kuitert (1 female); Huntington Lake, Fresno Co., 7,000 ft., July 10, 1919, F. C. Clark (1 female) (Calif. Acad.); Redwood Cn., Fresno Co., Alt. 6,000 ft., E. C. Van Dyke, 1 male (Calif. Acad.); Tuoleme Meadows, Mariposa Co., Aug. 1, 1940, L. C. Kuitert (1 female); Alma, Santa Clara Co., June 22, 1931, C. H. Martin (1 male, 4 females); Menlo Pk., San Mateo Co., Jan., 1905, F. Hornung (1 female); Alameda Co., Niles Canyon, Aug. 14, 1927 (Usinger); Yosemite Nat'l Park, Aug. 1, 1940, L. C. Kuitert (7 males, 9 females); Yosemite, Aug. 23, 1936, Owen Bryant (Bryant Col.); Glacier Pk., Alt. 7,214 ft., June 15, 1928 (Usinger); Pothole Meadows, June 14, 1928 (Usinger); Pothole Meadows, Alt. 7,750 ft., June 14, 1928, F. A. Haasis (Cal. Acad.); Berkeley, Oct. 23, 1929, Jean Linsdale (2 females); Mokelumne Hill, Calaveras Co., May 29, 1931 (Usinger); Alpine Co., July, 1934, J. E. Blum (Cal. Acad.); Antioch, Sacramento Co., July 20, 1935, Jack Beamer (1 female); Mt. Tamalpais, Marin Co., Aug. 15, 1938, D. W. Craik (1 female); Towie, Placer Co., Aug. 20, 1938, D. W. Craik (1 male); Eureka, Humboldt Co., July 15, 1935, R. H. Beamer (1 male); Clayton, Shasta Co., July 20, 1935, Jack Beamer (1 male, 1 female); Clayton, Shasta Co., July 14, 1918, E. P. Van Duzee (1 female) (Cal. Acad.); California, T. H. Hubbell (Hubbell Coll.) (1 male); Alameda Co., Feb., 1910, J. C. Bridwell (U. S. N. M.) (1 female).

Oregon: Grant's Pass, July 12, 1935, Jack and R. H. Beamer (5 males, 31 females); Heppner, July 27 and Aug. 25, 1907, Nettie Currin (1 male, 2 females) (Drake); Philomath, Oct. 17, 1903, Gillatly (Drake); Corvallis, Oct. 17, 1903, Gillatly (Drake); Yoncalla, July 12, 1935, R. H. Beamer (5 males, 3 females); Gaston, 1 male.

Graptocorixa emburyi Hungerford

(Plate XXVII, figs. 4, 4a to 4c)

1938. *Graptocorixa emburyi* Hungerford, H. B. Pan-Pacific Ent XIV, No. 2, pp. 76-77. P. 80, figs. 6, 7, 8 and 9.

Size: Length 5.9 mm. to 6.1 mm.; width across head 1.8 mm. to 1.9 mm.

Color: General color dark with pattern typical for the genus. Pronotum crossed by nine or ten dark bands, no wider than the pale interspaces; the anterior four entire, others may be somewhat split. Pale lines on base of clavus more or less reddish and broader than the dark ones, elsewhere on the hemelytra the dark bands are as broad or a little broader than the pale ones and undulate. Basal half of embolium reddish; a sooty blotch on nodal furrow, behind which the margin is checkered. Venter brown to black. Head and legs yellowish, only the base of the middle tibia and distal end of middle tarsus embrowned.

Structural characteristics: The so-called beak reduced. (See figure 4a, Plate XXVII.) Frontal depression of male shallow and somewhat pilose, often densely so; female with facial area flat and moderately pilose. Infraocular portion of genae narrowing laterally, the face appearing considerably reduced. Antennal segments: 1 : 2 : 3 : 4 :: 22 : 16 : 42 : 20 (both sexes). Prothoracic lateral lobe moderately elongate. The lower basal angle of the anterior femur not angularly produced, a small patch of short bristles on an elevated area in the male. The pala of the male as shown in figure 4 on plate XXVII with thirty-six to forty pegs; pala long and slender and ending in a stout claw in both sexes. Middle leg: femur : tibia : tarsus : claws :: 100 : 38 : 31.9 : 28.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 94.6 : 111.6 : 36.1. Metaxyphus length to its width as 26 : 24. The male genital capsule and abdominal dorsum as shown in figures 4b and 4c on Plate XXVII. The male strigil with six longitudinal combs.

Location of types: The male holotype, the allotype and eight paratypes, all females, labeled "Mexico, June 10, 1937, Meldon Embury, San Antonio, near El Salto, 5,000 ft. above sea level, semitropical," are in the Francis Huntington Snow Entomological Museum, University of Kansas.

Comparative notes: This species is a trifle smaller than *G. serrulata* (Uhler). It differs from Uhler's species in the more slender pala, reduced beak, sharper metaxyphus, the shape of the strigil, and in lacking the curious projection on the penultimate abdominal segment that characterizes the male of *G. serrulata* (Uhler).

Data on distribution: (Plate XXX) Besides the type series, we have:

MEXICO: *Michoacán:* El Sabino, Uruápan, Aug. 2, 1936, H. D. Thomas, 2 males, 4 females; Tancítaro, alt. 6,586 ft. permanent pool, Aug. 8, 1940, F. Schacht, 1 male, 1 female (taken with *G. henryi*).

Sonora: San Bernardo, Río Mayo, Oct. 14, 1934, H. S. Gentry, 3 males, 12 females; Río Mayo, Arroyo de los Mescales, Feb. 16, 1935, H. S. Gentry, 11 males, 3 females.

Chihuahua: Carimechi, Río Mayo, Jan. 1, 1935, H. S. Gentry, 3 males, 12 females.

Graptocorixa serrulata (Uhler)

(Plate XXVII, figs. 3, 3a to 3c)

1897. *Corixa serrulata* Uhler, P. R. Trans. Md. Acad. Sci. I, p. 391.

1901. *Corixa serrulata*, Champion, G C. Biol. Centr. Amer. Heter., II, p 381

1909. *Arctocorisa serrulata,* Kirkaldy, G. W. and Torre-Bueno, J. R de la. Catalogue *in* Proc. Wash. Ent. Soc , X, Nos. 3-4, p. 197

1917. *Arctocorixa serrulata*, Van Duzee, E P. Catalogue of Hemiptera, p. 483

1925. *Arctocorixa serrulata*, Hungerford, H B Bull. Brooklyn Ent. Soc., XX, No 1, pp. 17-18. (Dist Ariz.)

1930. *Graptocorixa serrulata*, Hungerford, H. B. Pan-Pacific Ent , VII, No 1, p. 22

1928. *Graptocorixa serrulata*, Hungerford, H B Pan-Pacific Ent., XIV, p 77 P. 80, fig. 10.

Size: Length 6.1 mm. to 6.7 mm.; width across head 1.9 mm. to 2.1 mm.

Color: General facies medium to dark; pronotum crossed by about nine dark brown to nearly black bands, the anterior two or three of which are broader than the others which may be somewhat broken or furcate; hemelytra crossed by wavy, somewhat broken, bands, the dark ones on the whole slightly broader than the pale ones, except at inner base of clavus; the confluence of the pale ones often marking the margin of the membrane; embolium with a blackish spot on the nodal furrow. Venter mostly brown to black; the abdominal dorsum somewhat sanguineous. Head ivory white to yellow except beak and frons which may be embrowned. Legs ivory white to yellow with the apical half of the pala, dorsal side of anterior femur, the dorsal distal half of middle femur, base of middle tibia and tip of tarsus embrowned to black.

Structural characteristics: Frontal depression of male broadly oval, deep and covered with appressed pile of white hair. Female face rounded, with few hairs. Infraocular portion of genae broad laterally as seen in cephalic view. Antennal segments: 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 16 (both sexes). Rear margin of eyes concave and head margin convex, making the postocular space broadest about the middle. Prothoracic lateral lobe elongate. The lower basal angle of the anterior femur not angularly produced; a small rusty patch of elongate pegs or short spines on base of male femur. The pala of the male as shown in figure 3 on plate XXVII, possessing a row of about forty to forty-four pegs. Middle leg: femur : tibia : tarsus : claws :: 100 : 32.9 : 28.6 : 28.6. The femur in both sexes with a close set row of pegs on its caudo-ventral margin. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 81 : 108 : 40.5. Metaxyphus length to its width as 30 : 30. The male genital capsule and abdominal dorsum as shown in figures 3b and 3c on plate XXVII. The strigil with five or six combs. The right penultimate lobe of the abdomen of the male (seventh segment) with peglike projection at its outer base.

Location of types: In the United States National Museum from the P. R. Uhler collection are three male specimens, one bearing the labels "Bradsh. Mt., Ariz., 6-16-92," "P. R. Uhler Collection," and "*Corixa serrulata* Uhler," the last in Uhler's handwriting. This we are labeling the holotype. Another is labeled "Mexico highlands," "P. R. Uhler Collection" and determined by Uhler as "*Corixa maculatipes* Uhler Mex." The third specimen is labeled "N. M.," "P. R. Uhler Collection." Since in Uhler's description he says ". . . it inhabits the highlands of Mexico, Southern California and Arizona," we must not admit the "N. M." specimen in the type series but may assume that he intended to include the Mexican highland specimen. As yet we have not found the Southern California specimens.

Comparative notes: This little species is distinguished from others of similar size by having a closely set row of pegs on the caudo-ventral margin of the middle femur in both sexes and a finger or peg-like projection on the outer base of the right penultimate lobe of the male abdomen.

Data on distribution: (Plate XXX). We have before us the following:

MEXICO: *Michoacán:* Morelia, Sept. 3, 1938, H. D. Thomas, 1 male.

Chihuahua: July 14-22, 1938, L. J. Lipovsky, 18 males, 14 females; San Antonio, July 15, 1927, L. D. Anderson, 3 males, 13 females; Río San Pedro, June 22, 1934, Smith and Dunkle, 9 males, 3 females; Sta. Eulalia, 1934, W. F. Foshag (U. S. N. M.), 4 males, 6 females.

Guerrero: Papagochie R., 1934, W. F. Foshag (U. S. N. M.), 1 male, 3 females.

U. S. A.: *Oregon:* Harney Co., July 26, 1934, C. L. Hubbs (Mich. Coll.), 1 female.

Nevada: White Pine Co., Spring Valley, July 6, 1938, Hubbs family (Mich. Coll.), 1 female.

Arizona: Pima Co., Aug. 16, 1927, P. A. Readio, 3 males, 3 females; Tucson, F. H. Snow, 14 males, 34 females; Tucson, Jan. 27, 1935 (Bryant Coll.); Santa Catalina Mts., May 8, 1933 (Bryant Coll.); Cienega Creek, near Pantano, alt. 3,200 ft., March 12, 1932, Duncan (Lutz); Baboquivari Mts., F. H. Snow, 4 males, 4 females; same place, July 18, 1932, R. H. Beamer, 2 males, 9 females; S. W. edge of Tucson, July 20, 1932, R. H. Beamer, 3 males, 6 females; Santa Rita Mts., June, F. H. Snow, 1 female; same place, July 17, 1932, R. H. Beamer, 7 males, 6 females; Ruby, July 13, 1940, L. C. Kuitert, 1 male; Oro Blanco Mts., April 3, 1937, Owen Bryant; Santa Cruz Co., Aug. 4, 1927, R. H. Beamer, 9 males, 6 females; by Readio, 5 males, 9 females; Tubac, Aug. 21, 1935, Jack Beamer, 1 male, 2 females; by R. H. Beamer, 4 males, 4 females; Cochise Co., July 29, 1927, R. H. Beamer, 1 female; Chiricahua Mts., July 8, 1932, R. H. Beamer, 1 male, 3 females; same place, July 14, 1938, D. W. Craik, 6 males, 8 females; same place, July 5, 1940, L. C. Kuitert, 1 female; Huachuca Mts., July 8, 1932, R. H. Beamer, 7 males, 4 females; same place, Sunnyside Canyon, July 9, 1940, L. C. Kuitert, 7 males, 26 females; Maricopa Co., July 1, 1929, Beamer and Anderson, 4 males, 4 females; by Paul Oman, Aug. 2, 1929, 2 males, 1 female; Gila Co., Aug. 5, 1927, P. A. Readio, 7 males, 7 females; Oracle, 14 mi. east, July 27, 1924, J. O. Martin (Calif. Acad.); Yavapai Co., Aug. 9, 1927, R. H. Beamer, 3 males, 3 females; Bradshaw Mts., June 18, 1892 (Drake Coll.); Bill Wms. Fork, Aug., F. H. Snow, 7 specimens; Yavapai Co., Camp Verde, Sept. 2, 1938, Hubbs family (Mich. Coll.), 2 females; Coconimo Co., General Springs, Aug. 29, 1935, I. J. Cantrall, 3 males, 3 females; Santa Rita Mts., July 21, 1938, R. I. Sailer (U. S. N. M.), 1 male, 1 female; Huachuca Mts., Sunnyside Canyon, July 9, 1940, (U. S. N. M.), 9 males, 4 females; Catalina Mts., Sabino Canyon, Oct. 26, 1915, F. Tucker, 1 female; Santa Cruz Co., July 9, 1940, M. F. Ashburn, 1 female.

New Mexico: Silver City, July 22, 1936, J. D. Beamer and M. B. Jackson, 28 males, 15 females; Belen, July 20, 1936, W. D. Field, 1 male; White Oak, July 1, 1923, K. C. Doering, 1 female; Mimbres R., Luna Co., June 9, 1938, Hubbs family (Mich. Coll.), 16 males, 68 females.

Texas: Presidio Co., July 16, 1927, R. H. Beamer, 2 males, 7 females; Brewster Co., Río Grande, June 13-17, 1908, Mitchell and Cushman, 11 males, 15 females, det. by Uhler (U. S. N. M.); Jeff Davis, July 19, 1933, R. H. Beamer, 6 males, 13 females; Ft. Davis, July 12, 1938, L. W. Hepner, 1 female; Davis Mts., July 12, 1938, R. I. Sailer, 3 males, 5 females; by D. W. Craik, 1 male, 6 females; Valentine, July 13, 1927, R. H. Beamer, 8 males, 6 females.

Graptocorixa gerhardi (Hungerford)

(Plate XXVII, figs. 1, 1a and 1b)

1925. *Arctocorixa gerhardi* Hungerford, H. B. Bull. Brooklyn Ent. Soc., XX, pp. 21-22, Pl. II, fig. 1.

1930. *Graptocorixa gerhardi*, Hungerford, H. B. Pan-Pacific Ent., VII, No. 1, p. 25 (Dist. Ariz., Texas.)

1931. *Graptocorixa gerhardi*, Jaczewski, T. Annales Musei Zool. Polonici, IX, No. 15, p. 191, Pl. XXV, figs 2-6. (Dist. Mexico, D. F., Chapultepec.)

1939. *Graptocorixa gerhardi*, Millspaugh, Dick D. Field and Lab., VII, No. 2, p. 85

Size: Length 7 mm. to 8.4 mm.; width across head 2.26 mm. to 2.73 mm.

Color: General facies dark; head and legs, including coxae, yellow; mesosternum nearly black and metasternum and abdominal venter more or less black, especially on the males; abdominal dorsum may be partly sanguineous. Pronotum crossed by eight or nine pale bands that are usually narrower than dark ones, but show considerable variation. On the hemelytra the pale bands are broadest at inner angle of the clavus, elsewhere they are more or less undulate and sometimes broken, especially on the membrane.

Structural characteristics: Face not reduced; frontal depression of male shallow but broad and covered with appressed silvery hair; face of female not flattened and with few hairs. Infraocular portion of genae broad laterally as seen in cephalic view. Antennal segments: 1 : 2 : 3 : 4 :: 30 : 15 : 50 : 12 (♂); 1 : 2 : 3 : 4 :: 30 : 15 : 50 : 10 (♀). Rear margin of eyes nearly straight. Prothoracic lateral lobe elongate. The lower basal angle of the anterior femur conspicuously produced in male and covered with a patch of short hairs; slightly produced in female. The pala of the male as shown in figure 1, Plate XXVII, possesses about twenty-five pegs. Middle leg: femur : tibia : tarsus : claws :: 100 : 33.6 : 29 : 25.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.8 : 115.4 : 44.4. Metaxyphus length to its width as 20 : 20. The male genital capsule and abdominal dorsum as shown in figures 1a and 1b on Plate XXVII. The strigil is minute and at the tip of a strongly sclerotized process which is broader at base. The preceding segment has a unique fingerlike projection near its right margin.

Location of types: Holotype male from "Gila River, N. M., July 9, W. J. Gerhard" in Francis Huntington Snow Entomological Collection, University of Kansas.

Comparative notes: This species differs from *G. melanogaster* (Kirk.) in having the front femur produced at inner base and in having a shorter metaxyphus.

Data on distribution: (Plate XXX).

U. S. A.: *Texas:* Musquiz Cañon, Ft. Davis, July 6, 1917, 1 male, 1 female (Cornell); Limpia Cañon, Davis Mts., July 7, 1917, 1 male (Cornell); Brewster Co., May 3, 1927, J. O. Martin, 8 males, 3 females; Alpine, May 12, 1927, J. O. Martin, 1 male; Ft. Davis Mts. (U. S. N. M.) 1 male, 1 female; Alpine, July 25 (Lutz Coll.), 1 male, 1 female.

New Mexico: Gila River, July 9, W. J. Gerhard, *type*, 1 male.

Arizona: Santa Cruz Co., Aug. 4, 1927, Beamer and Readio, 6 males, 4 females; Santa Cruz Co., June 9, 1940, M. F. Fishburn, 1 male (U. S. N. M.); Gila Co., Aug. 5, 1927, P. A. Readio, 1 male; Cochise Co., July 29, 1927, R. H. Beamer, 4 females; Santa Rita Mts., July 24, 1927, P. A. Readio, 1 female; Baboquivari Mts., July 18, 1932, R. H. Beamer, 1 female; Huachuca Mts., July 8, 1932, R. H. Beamer, 8 males, 3 females; Huachuca Mts., May 29, 1937, W. Benedict, 2 males, 1 female; Sunnyside Canyon, Huachuca Mts., July 9, 1940, L. Kuitert, 9 males, 16 females; Carr Canyon, Huachuca Mts., June 24, 1932 (Usinger Col.); Santa Catalina Mts., Owen Bryant; Arivaca, April 3, 1937, Owen Bryant; Santa Cruz Co., (U. S. N. M.), 1 male; Santa Cruz Co., Sept. 7, 1938, Hubbs family (Mich. Coll.), 1 female.

MEXICO: *Jalisco:* Chapala, Sept. 11, 1938, H. D. Thomas, 2 males, 1 female; Unión de Flores, Sept. 16, 1938, H. D. Thomas, 1 male.

Chihuahua: 1 female (Uhler Coll.); Choncho and Vaica, July 19-22, 1938, L. J. Lipovsky, 4 males, 3 females; Río San Pedro, June 23, 1934, Smith and Dunkle, 1 male.

Aguascalientes: July 16, 1934, Smith and Dunkle, 1 female.

San Luis Potosí: Aug., 1944, Henry Thomas, 27 males, 26 females; 20 miles west of San Luis Potosí, Aug. 8, 1944, Henry Thomas, 1 male, 3 females.

Puebla: Puebla, July 18, 1937, H. D. Thomas, 1 male, 1 female; Puebla, July 24, 1937, H. D. Thomas, 2 males, 2 females.

México: D. F., Chapultepec, Aug. 2, 1929, T. Jaczewski, 3 males, 2 females, 3 larvae. (Reported by Jaczewski.).

Graptocorixa gentryi Hungerford

(Plate XXVIII, figs. 3, 3a and 3b)

1938. *Graptocorixa gentryi* Hungerford, H. B. Jl. Kans. Ent Soc., XI, No. 4, pp 136-137, p. 141, fig. 5.

Size: Length 6.8 mm. to 7.2 mm.; width across head 2.2 mm. to 2.4 mm.

Color: General color dark; pronotum crossed by nine or ten dark bands about as wide as the pale interspaces; hemelytra crossed by wavy, somewhat broken, bands, the dark ones on the whole slightly broader than the pale ones, except at the inner base of the clavus; the pattern continuing over the membrane but sometimes separated from the corium by a pale streak. Venter may be light or dark; the abdominal dorsum may be somewhat sanguineous. Head and legs yellow except the distal half of the palae, the tibiae and tip of tarsi of middle legs usually dark.

Structural characteristics: Frontal depression of male broadly oval, nearly attaining margin of eye and covered with inconspicuous appressed pile of white hair. Female face rounded. Infraocular portion of genae broad laterally as seen in cephalic view. Antennal segments: 1 : 2 : 3 : 4 :: 25 : 20 : 45 : 15 (♂); 1 : 2 : 3 : 4 :: 25 : 20 : 50 : 18 (♀). Rear margin of eyes nearly straight. Prothoracic lateral lobe slightly elongate, obliquely truncate. The lower basal angle of the anterior femur not angularly produced. The pala of the male as shown in figure 2a on Plate XXVIII possessing a row of about 36-38 pegs. Middle leg: femur : tibia : tarsus : claws :: 100 : 30.6 : 31.9 : 23.9; thus the middle tarsus is slightly longer than the tibia. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 87.5 : 112.5 : 45. Metaxyphus length to its width as 38 : 28. The male genital capsule and abdominal dorsum as shown in figures 2 and 2b on Plate XXVIII. The male strigil with 4 combs.

Location of types: Holotype, allotype and 7 paratypes in Francis Huntington Snow Entomological Collection, University of Kansas. Series labeled "San Barnardo, Rio Mayo, Sonora, Mexico, Oct. 14, 1934, H. S. Gentry."

Comparative notes: This species which is about the size of *G. serrulata* (Uhler) is readily distinguished from it by the narrower postocular area of the head, by the prothoracic lateral lobe, which is broader and more obliquely truncate, as well as by the more slender and tapering male pala.

Data on distribution: (Plate XXX). Known only from the type series from *Sonora,* MEXICO.

Graptocorixa gentryi devlini Hungerford

(Plate XXVIII, figs. 4, 4a and 4b)

1938. *Graptocorixa gentryi devlini* Hungerford, H. B Jl Kans Ent. Soc., XI, No. 4, pp. 137-141, fig. 4.

Size: Length 6.5 mm. to 6.9 mm.; width across head 2.2 mm. to 2.4 mm.

Color: As in *G. gentryi* Hungerford.

Structural characteristics: Differs from *G. gentryi* Hungerford only in some minor points, the most noteworthy of which is the right clasper of the male. The seven males all have a conspicuous patch of rather long white hairs on the middle femur whereas the four males of *G. gentryi* do not. Antennal segments: 1 : 2 : 3 : 4 :: 20 : 18 : 40 : 18 in both sexes. Middle leg: femur : tibia : tarsus : claw :: 100 : 27.9 : 31.9 : 21.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 79.5 : 104.4 : 34.1. Thus the tibia and tarsus of hind leg are relatively shorter than in *G. gentryi.* The male genital capsule and abdominal dorsum as shown in figures 3 and 3b on plate XXVIII.

Location of types: Holotype, allotype and one paratype female labeled "Cuautla Morelos, Mexico, October 12, 1936, H. D. Thomas." Two paratypes from "El Sabino, Uruapan, Mich., Mex., July 28, 1936, H. D. Thomas," male and female. All in Francis Huntington Snow Entomological Collection, University of Kansas.

Data on distribution: (Plate XXX). Besides the types:

MEXICO: *Michoacán:* Near Chinapa, Sept. 5, 1938, H. D. Thomas, 3 males, 5 females; El Sabino, Uruápan, July 24, 1936, H. D. Thomas, 2 females.

México: Tejupilco, Temascaltepec, July 16, 1933, Hinton and Usinger, 2 males, 1 female.

Morelos: Acatlipa, Km. 88 on Hgw. México City to Acapulco, May 6, 1945, J. G. Shaw.

Graptocorixa henryi Hungerford

(Plate XXVIII, figs. 2, 2a and 2b)

1938. *Graptocorixa henryi* Hungerford, H B. Jl. Kans. Ent. Soc. XI, No. 4, pp. 137-138. P. 141, fig. 6.

Size: Length 6 mm. to 6.3 mm.; width across head 1.9 mm. to 2 mm.

Color: Moderately dark, a little lighter and less contrastingly marked than in *G. serrulata* (Uhler); the pronotum crossed by eight or nine brown lines, usually narrower than the pale interspaces and the last four more or less broken; the dark barring of the hemelytra wavy, somewhat interjoined and on the whole very slightly broader than the pale interspaces; head and legs yellowish to light brown; venter of same color, somewhat infuscated.

Structural characteristics: Frontal depression of male broadly oval and covered with a pile of appressed white hairs. Female face rounded with the white hairs more sparsely covering the area. Infraocular portion of genae broad laterally as seen in cephalic view. Antennal segments: 1 : 2 : 3 : 4 :: 25 : 14 : 49 : 12 (♂); 1 : 2 : 3 : 4 :: 25 : 14 : 48 : 12 (♀). Interocular space narrow, plainly less than width of eye as measured by projection. Postocular strip of uniform width. Prothoracic lateral lobes rather elongate and rounded at the tip. The lower basal angle of the anterior femur not angularly produced. The pala of the male as shown in figure 1a on Plate XXVIII and with a row of about 32 pegs. Middle leg: femur : tibia : tarsus : claws :: 100 : 32.9 : 28.6 : 34.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 77.5 : 100 : 45. Metaxyphus length to its width as 30 : 25. The rear margin of the antipenultimate ventral abdominal segment of female (sixth segment) incised on its right side (left side of insect). The male genital capsule and abdominal dorsum as shown in figures 1 and 1b on Plate XXVIII. The male strigil circular in outline and consisting of about seven combs.

Location of types: Holotype, allotype and fifteen paratypes in the Francis Huntington Snow Collection, University of Kansas. Described from nine males and eight females labeled "El Sabino, Uruápan, Michoacán, Mexico, Aug. 2, 1936, H. D. Thomas."

Comparative notes: This species is near *G. melanogaster* (Kirk.) from which it differs by its smaller size and narrower interocular space. From *G. serrulata* (Uhler) it differs by its more elongate metaxyphus and from *G. gentryi* Hungerford by its rounded prothoracic lateral lobe.

Data on distribution: (Plate XXX). Besides the type series we have the following:

MEXICO: *Michoacán:* "Tancitaro, Alt. 6,586 ft., Permanent Pool, Aug. 8, 1940, F. Schacht," 2 males, 4 females (male and female of *G. emburyi* taken with these).

Morelos: Morelos, July 14, 1936, H. D. Thomas, 2 males; Cuernavaca, July 8, 1936, H. D. Thomas, 1 male.

Graptocorixa melanogaster (Kirkaldy)

(Plate XXVII, figs. 2, 2a and 2b)

1899. *Corixa melanogaster* Kirkaldy, G. W. Entomologist, XXXII, p. 193.

1901. *Corixa melanogaster,* Champion, G. C. Biol. Centr Amer. Het II, p. 381 (quot.).

1901. *Corixa unguiculata* Champion, G. C. Biol. Centr. Amer. Het. II, p. 382, Pl. XXII, figs. 26, 26a, b. (I examined type from British Mus., syn. of above.)

1909. *Arctocorisa melanogaster*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue in Proc. Ent. Soc. Wash. X, Nos. 3 and 4, p. 196.

1909. *Arctocorisa unguiculata*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue in Proc. Ent. Soc. Wash. X, Nos. 3 and 4, p. 197.

1925. *Arctocorixa melanogaster*, Hungerford, H. B. Bull. Brooklyn Ent. Soc. XX, pp. 20-21 (reports *C. unguiculata* Champ. as syn.).

1930. *Graptocorixa melanogaster*, Hungerford, H. B. Pan-Pacific Ent. VII, No. 1, pp. 22-23, and 25.

1931. *Graptocorixa melanogaster*, Jaczewski, T. Annales Musei Zoologici Polonici IX, Nr. 10, p. 150, Pl. XIII, figs. 1-4.

1938. *Graptocorixa melanogaster*, Hungerford, H B. Jl. Kans Ent. Soc. XI, No. 4, p. 138.

Size: Length 7.6 mm. to 8.1 mm.; width across head 2.3 mm. to 2.5 mm.

Color: General facies dark; pronotum crossed by nine to eleven dark bands about as broad as the pale interspaces; hemelytra crossed by wavy, somewhat broken bands, the dark ones usually broader than the pale ones except at base of clavus; the pattern continuing over the membrane without line of demarcation. Thoracic venter mostly black and abdomen of male usually black. Head and legs yellow except for the coxae, trochanters, base of front femora, base of middle tibiae, tips of middle and hind tarsi which are usually embrowned.

Structural characteristics: Facial impression of the male broadly oval and covered with an appressed pile of white hair. Female face somewhat flattened with sparse pile of white hair. Infraocular portion of genae broad laterally as seen in cephalic view. Antennal segments: 1 : 2 : 3 : 4 :: 24 : 18 : 50 : 17 ♂; 1 : 2 : 3 : 4 :: 25 : 19 : 52 : 18 ♀. Interocular space broad, equal to width of eye measured by projection. Rear margin of eyes nearly straight. In the females the distal half of the pruinose area along the claval suture obscured by the depressed margin of the clavus. Prothoracic lateral lobe rounded rather than obliquely truncate. The lower basal angle of the anterior femur not angularly produced, but elevated and provided with a rusty-colored patch of short, spiniform, thickened hairs in the male. The pala of the male as shown in figure 2 on Plate XXVII and provided with a row of 35 to 40 pegs. Middle leg: femur : tibia : tarsus : claws :: 100 : 33.6 : 31.3 : 32.5 Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 84.4 : 106.6 : 40. The distal third of the ventral caudal margin of the hind femur with a close set row of 20-25 short spines in both sexes which distinguishes this species from all other *Graptocorixa* of comparable size. Metaxyphus length to its width as 38 : 28. The male genital capsule and abdominal dorsum as shown in figure 2b and 2a on

Plate XXVII. The male strigil fairly large, nearly circular, sometimes nearly square, with 6-8 or more combs and attached by a pedicle, only the base of which is exposed. In the female the ventral lateral lobes of the seventh abdominal segment very broad and medianly expanded on the caudal margin.

Location of types: This species was described by Kirkaldy from Alajueta, Costa Rica, and came to him by way of Doctor Montandon. Upon Kirkaldy's death the type, a male, went to J. R. de la Torre-Bueno who kindly sent it to me with other Corixidae of the Kirkaldy collection. It is at present in the University of Kansas collection. It bears the label "Type—*Corixa melanogaster* Kirk. 1899." One wing cover, the right one, is removed and mounted on a card below. Both front claws are gone from the palae which probably is the reason Kirkaldy failed to mention a prominent claw and this led Doctor Champion to think his *C. unguiculata* was different.

Corixa unguiculata Champion was described from Oaxaca, Mexico, and Costa Rica. I have examined the type at the British Museum and it is the same as *G. melanogaster* Kirkaldy. It bears the following labels: "B. C. A. Rhyn. II, *Corixa unguiculata* Ch. type," "Costa Rica (Biolley)," "Distant Col."

Comparative notes: This species differs from similar species in having the distal third of the ventral caudal margin of the hind femur provided with a close set row of 20-25 short spines. Comparable species have only a few such spines and they are not closely set.

Data on distribution: (Plate XXX.)

Costa Rica: Alajueta (type male); San José, Feb. 1905, P. Biolley, 2 males, 1 female (Bueno Col.); Vista del Mar, 1,400 m., Mar. 1905, P. Biolley, 1 male; San José, June and July, 1931, H. Schmidt, 2 males, 8 females; San José, March 6, 1931, H. Schmidt, 2 males; 9 females. San José, H. Schmidt, 1932, 1 male, 3 females; Costa Rica, Feb. 10, 1932, H. Schmidt, 39 males, 54 females; Costa Rica, June 23, 1932, B. S. Kaiser (Usinger Col.); Río Virilla, Dec. 16, 1931, H. Schmidt, 42 males, 52 females.

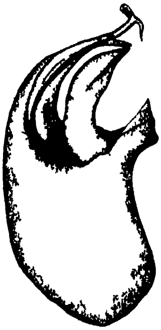
Mexico: Oaxaca.

PLATE XXV

Graptocorixa Hungerford

FIG. 1. *Graptocorixa abdominalis* (Say); front leg of male.
FIG. 1a. Genital capsule of male.
FIG. 1b. Pala of female.
FIG. 1c. Middle femur of male.
FIG. 1d. Middle femur of female.
FIG. 1e. Dorsal view of male abdomen.
FIG. 2. *Graptocorixa bimaculata* (Guérin); front leg of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Pala of female.
FIG. 2c. Middle femur of male.
FIG. 2d. Middle femur of female.
FIG. 2e. Dorsal view of male abdomen.

PLATE XXV



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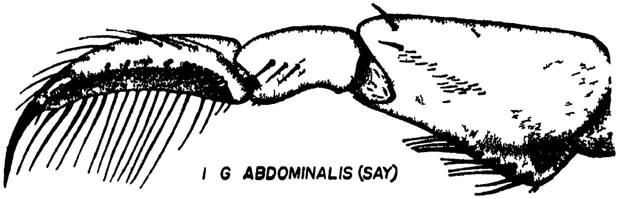
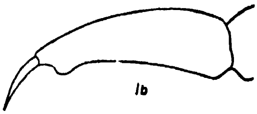


1 G ABDOMINALIS (SAY)



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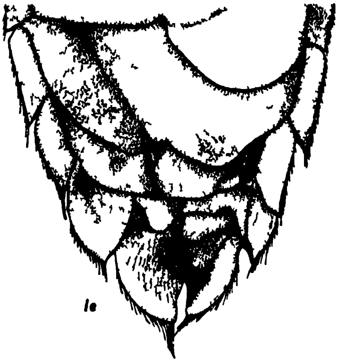
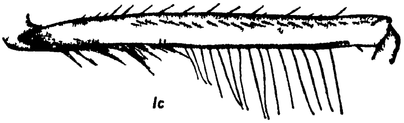


1e



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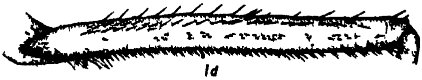

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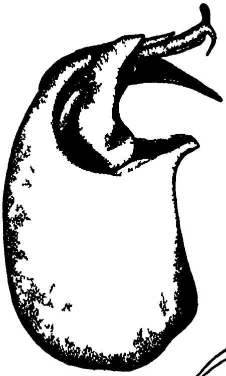
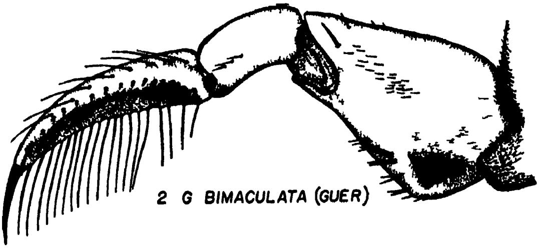
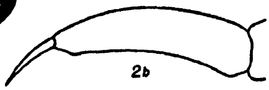


2a



2 G BIMACULATA (GUER)



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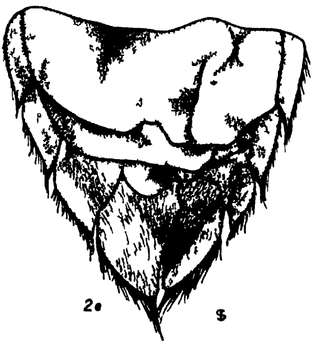
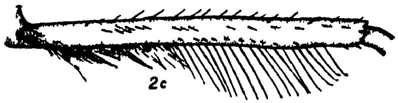


2e ♂



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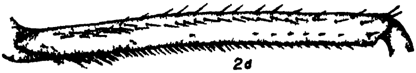


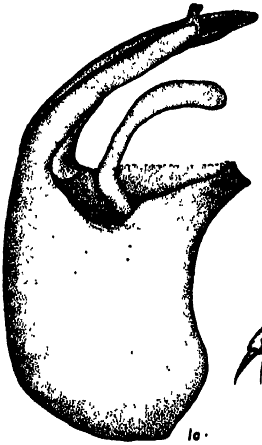
2d

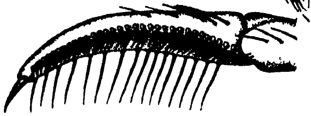
PLATE XXVI

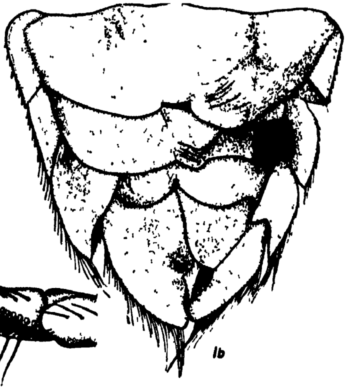
Graptocorixa Hungerford

FIG 1. *Graptocorixa californica* (Hungerford); pala of male
FIG. 1a. Genital capsule of male.
FIG. 1b. Dorsal view of male abdomen.
FIG. 2. *Graptocorixa uhleri* (Hungerford); pala of male
FIG. 2a. Genital capsule of male.
FIG. 2b. Dorsal view of male abdomen.
FIG. 3. *Graptocorixa uhleroidea* (Hungerford); pala of male
FIG. 3a. Genital capsule of male.
FIG. 3b. Dorsal view of male abdomen

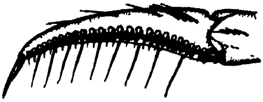
PLATE XXVI



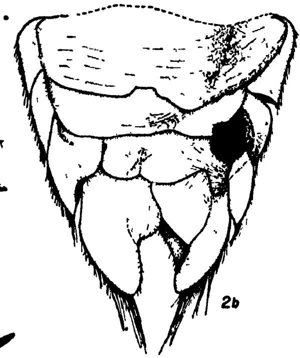


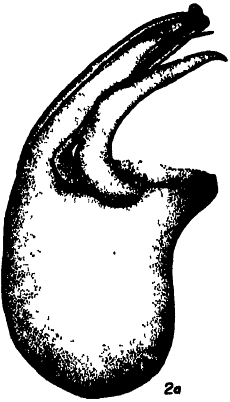


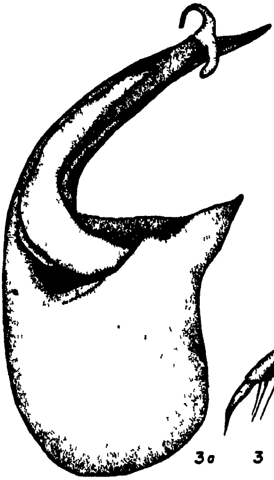
1 G CALIFORNICA (HUNGFD)

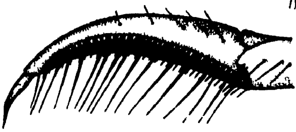


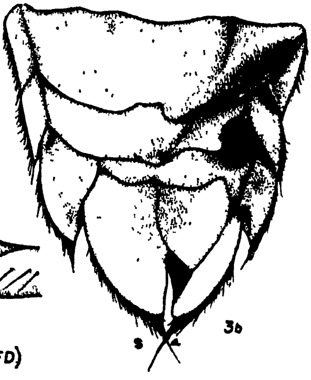
2 G UHLERI (HUNGFD)











3 G UHLEROIDEA (HUNGFD)

PLATE XXVII

Graptocorixa Hungerford

FIG. 1. *Graptocorixa gerhardi* (Hungerford); front leg of male.
FIG. 1a. Dorsal view of male abdomen.
FIG. 1b. Genital capsule of male.
FIG. 2. *Graptocorixa melanogaster* (Kirkaldy); front leg of male.
FIG. 2a. Dorsal view of male abdomen
FIG. 2b. Genital capsule of male.
FIG. 3. *Graptocorixa serrulata* (Uhler); pala of male.
FIG. 3a. Frontal view of head.
FIG. 3b. Genital capsule of male.
FIG. 3c. Dorsal view of male abdomen.
FIG. 4. *Graptocorixa emburyi* Hungerford; pala of male.
FIG. 4a. Frontal view of head.
FIG. 4b. Genital capsule of male.
FIG. 4c. Dorsal view of male abdomen.

PLATE XXVII

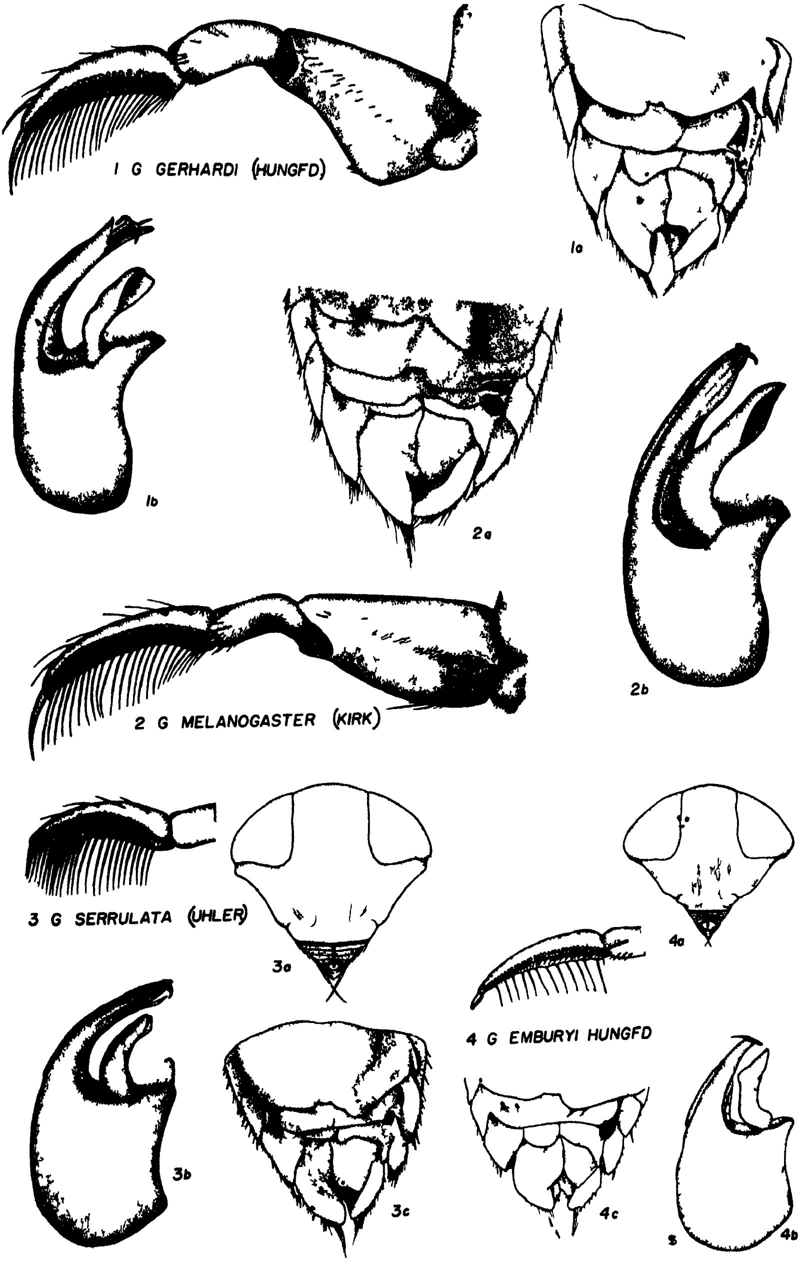
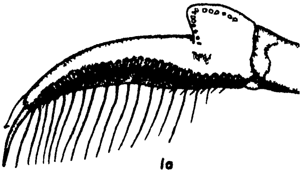

1 G GERHARDI (HUNGFD)
1a
1b
2a
2b
2 G MELANOGASTER (KIRK)
3 G SERRULATA (UHLER)
3a
4a
4 G EMBURYI HUNGFD
3b
3c
4c
4b

PLATE XXVIII

Graptocorixa Hungerford

FIG. 1. *Graptocorixa thomasi* Hungerford; dorsal view of male abdomen.
FIG. 1a. Pala of male.
FIG. 1b. Genital capsule.
FIG. 2. *Graptocorixa henryi* Hungerford; genital capsule of male.
FIG. 2a. Pala of male.
FIG. 2b. Dorsal view of male abdomen.
FIG. 3. *Graptocorixa gentryi* Hungerford; genital capsule of male.
FIG. 3a. Pala of male.
FIG. 3b. Dorsal view of male abdomen.
FIG. 4. *Graptocorixa gentryi devlini* Hungerford; genital capsule of male.
FIG. 4a. Pala of male.
FIG. 4b. Dorsal view of male abdomen.

PLATE XXVIII



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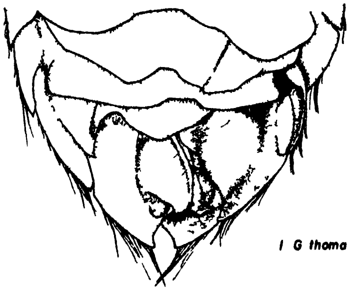
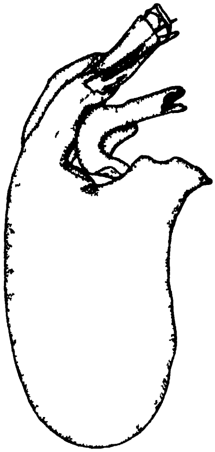
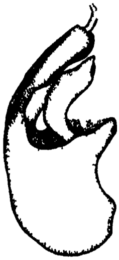


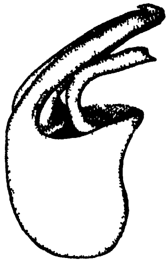
1 G thomasi



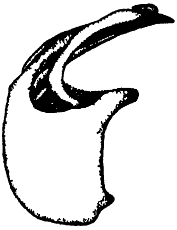
1b



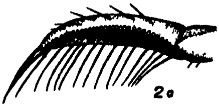
2 G HENRYI HUNGFD



3 G GENTRYI HUNGFD



4 G DEVLINI HUNGFD



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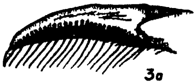
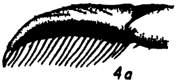
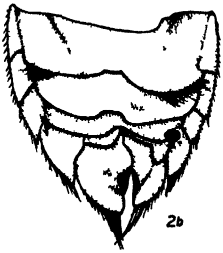


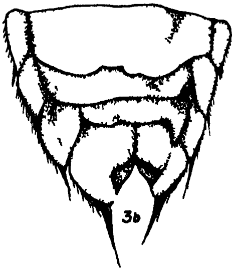
3a



4a



2b



3b

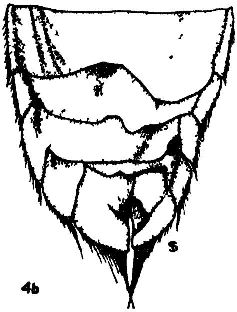


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PLATE XXIX

Graptocorixa Hungerford

FIG. 1. *Graptoconxa robusta* Hungerford; pala of male.
FIG. 1a. Genital capsule of male
FIG. 1b. Dorsal view of male abdomen.
FIG. 1c Dorsal view of male pala.
FIG. 2. *Graptocorixa ruina* Hungerford; front leg of male.
FIG. 2a Right clasper of male genital capsule.
FIG. 2b. Hind femur of male, ventral view.
FIG. 2c. Right view of right pala of male.
FIG. 2d Middle femur of male.
FIG. 2e. Dorsal view of male abdomen.

PLATE XXIX

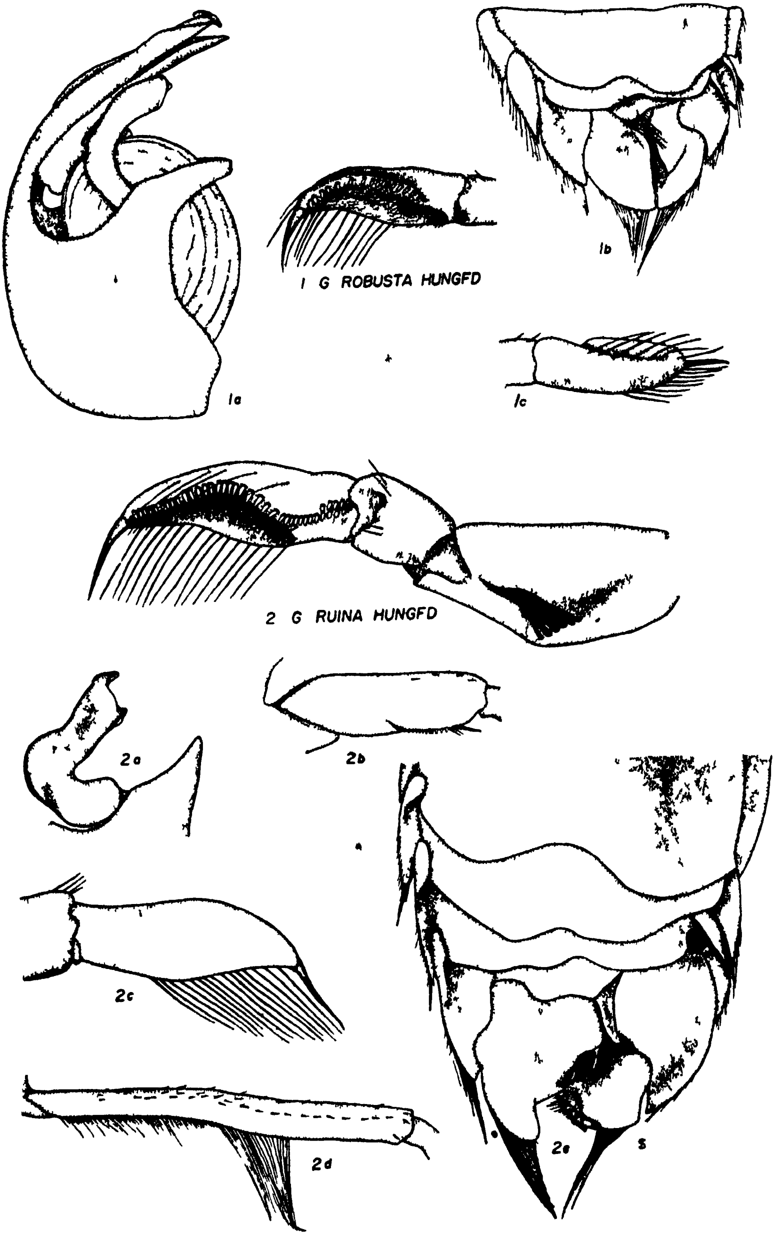
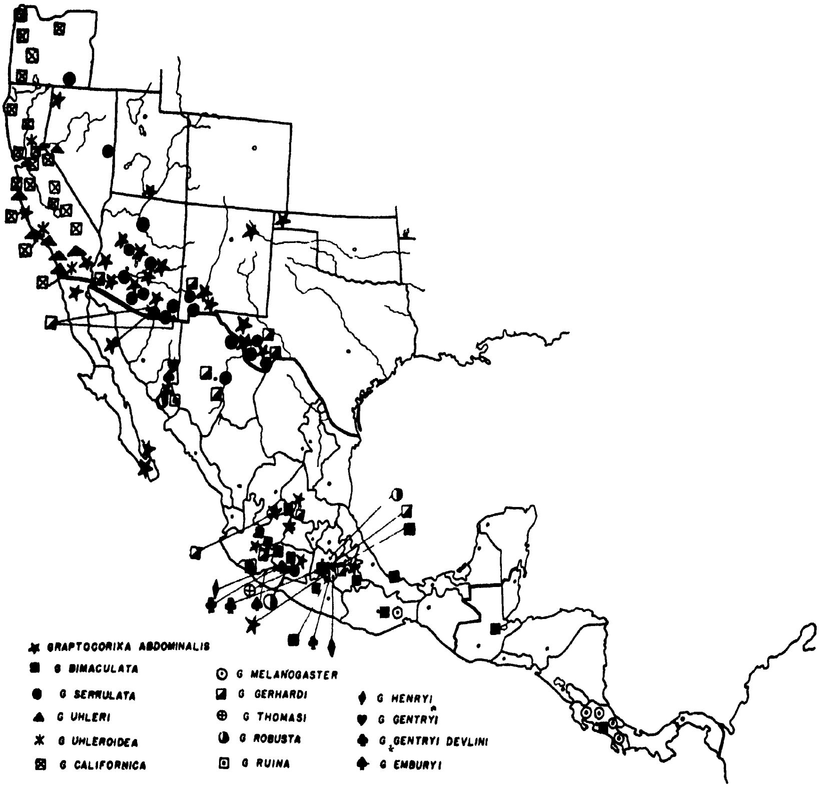


PLATE XXX


✶ GRAPTOCORIXA ABDOMINALIS
■ G BIMACULATA
● G SERRULATA
▲ G UHLERI
✱ G UHLEROIDEA
⊠ G CALIFORNICA
⊙ G MELANOGASTER
◪ G GERHARDI
⊕ G THOMASI
◑ G ROBUSTA
▣ G RUINA
♦ G HENRYI
♥ G GENTRYI
♣ G GENTRYI DEVLINI
♠ G EMBURYI

THE TRIBE CORIXINI WALTON

This tribe includes 20 genera and 13 subgenera which we have arranged below to show their phylogenetic relationships as correctly as we believe it is possible to do in a linear order. We consider the genus *Sigara* with its many subgenera as the most recent and within it the subgenus *Tropocorixa* contains our most variable species.

Ectemnostega Enderlein	Genotype ***quadrata*** (Sign.)	p. 200
Ectemnostegella Lundblad.	Genotype ***montana*** Lundb	p 206
Krizousacorixa Hungerford.	Genotype ***femorata*** (Guér)	p. 227
Trichocorixella Jaczewski.	Genotype ***mexicana*** (Hungfd)	p 236
Palmacorixa Abbott	Genotype ***gillettei*** Abbott	p 242
Corisella Lundblad.	Genotype ***mercenaria*** (Say)	p 259
Trichocorixa Kirkaldy	Genotype ***verticalis*** (Fieber)	p 289
Pseudocorixa Jaczewski.	Genotype ***guatemalensis*** (Champ)	p 408
Morphocorixa Jaczewski	Genotype ***compacta*** (Hungfd)	p 422
Neosigara Lundblad.	Genotype ***columbiensis*** Lundb	p. 429
Centrocorisa Lundblad	Genotype ***kollarii*** (Fieb.)	p 436
Ramphocorixa Abbott	Genotype ***acuminata*** (Uhler)	p 448
Callicorixa B White	Genotype ***praeusta*** (Fieb)	p 457
Corixa** Geoffroy.	Genotype ***punctata*** (Illig)	
Hesperocorixa Kirkaldy.	Genotype ***brimleyi*** Kirk	p 497
[Including ***Anticorixa*** Jaczewski.	Genotype ***sahlbergi*** (Fieb.)]	
Xenocorixa** Hungerford.	Genotype ***vittipennis*** (Horv)	p. 199
Heliocorisa** Lundblad	Genotype ***vermiculata*** (Put)	p 199
Cenocorixa Hungerford.	Genotype ***wileyæ*** (Hungfd)	p 564
Arctocorisa Wallengren.	Genotype ***carinata*** (Sahlb)	p 588
Sigara Fabricius.	Genotype ***striata*** (Linn.)	p 609
Arctosigara Hungerford	Subgenotype ***conocephala*** (Hungfd)	p 614
Allosigara Hungerford.	Subgenotype ***decorata*** (Abbott)	p 629
Parasigara** Poisson.	Subgenotype ***transversa*** (Fieb)	
Sigara** Fabricius.	Subgenotype ***striata*** (Linn.)	p 609
Xenosigara Hungerford	Subgenotype ***ornata*** (Abbott)	p 631
Pileosigara Hungerford.	Subgenotype ***douglasensis*** (Hungfd.)	p 634
Aphelosigara Hungerford.	Subgenotype ***jarmanae*** (Hungfd)	p 636
Pediosigara Hungerford	Subgenotype ***hydatotrephes*** (Kirk.)	p. 638
Subsigara Stichel.	Subgenotype ***fossarum*** (Leach)	p. 642
Lasiosigara Hungerford	Subgenotype ***lineata*** (Forst.)	p 645
Vermicorixa Walton.	Subgenotype ***lateralis*** (Leach)	p 652
Retrocorixa** Walton.	Subgenotype ***venusta*** (D. and S)	
Halicorixa** Walton.	Subgenotype ***stagnalis*** (Leach)	
Phaeosigara Hungerford.	Subgenotype ***signata*** (Fieb)	p 725
Tropocorixa Hutchinson	Subgenotype ***promontoria*** (Dist)	p. 763

UTILITY KEY TO THE GENERA OF CORIXINI OF THE WORLD

1. Small, shining insects less than 5 6 mm. long; males with sinistral asymmetry and with pala short, triangular, the tibia produced apically over it; females with the apices of clavi not exceeding a line drawn through the costal margins of the hemelytra at the nodal furrows. .. . *Trichocorixa* Kirkaldy
(See key, p. 289)

Not as above 2

2. (1) Interocular space as broad as or broader than an eye along rear margin Ventral surface of hind femur pubescent only on basal fifth or fourth of the front margin and bearing *two or more* irregular rows of short pegs on glabrous portion (See Plate XXXI, figs. 1 and 2.)** Male pala with pegs at distal

---

* Not represented in the Americas.

** Three species of *Corisella* (*decolor*, *tarsalis*, and *mercenaria*) have a *single* median longitudinal row of pegs on the ventral glabrous portion in combination with pubescence only at the base of the hind femur.

end of row elongate and crowded into a double row, basal pegs elongate and spine-like 3

Not as above 4

3. (2) Anterior tibia of male overlapping base of pala; ventral glabrous portion of hind femur with numerous fine hairs interspersed among the pegs.
Ectemnostega Enderlein
(See p. 200)

Anterior tibia of male not overlapping base of pala; ventral glabrous portion of hind femur with pegs only.....................*Ectemnostegella* Lundblad
(See key, p. 206)

4. (3) Inner posterior angle of eye sharply right angulate to acutely produced; (See Plates XXXVI and XXXVIII) lower posterior angle of front femur of male produced and bearing several rows of stridulatory pegs 5

Not as above 6

5. (4) Inner posterior angle of eye acutely produced; with a pruinose area on corial side of claval suture ....*Krizousacorixa* Hungerford
(See key, p. 227)

Inner posterior angle of eye sharply right angulate, occasionally slightly produced; without a pruinose area on corial side of claval suture.
Trichocorixella Jaczewski
(See p. 286)

6. (4) Rugulose species with rear margin of head sharply curved, embracing a very short pronotum; interocular space much narrower than the width of an eye; dorsal median lobe of the seventh abdominal segment of the male bearing a hook-like projection ... . '. .... *Palmacorixa* Abbott
(See key, p 242)

Not as above 7

7. (6) Smooth, shining insects, never more than faintly rugulose, ranging in size from 4 to 8.4 mm. long; lateral lobe of prothorax typically with sides tapering to a narrowly rounded apex; all but two small species with hind femur pubescent ventrally only at the base; male pala triangular, about equal in length to tibia, with a row of pegs near dorsal margin and another in or near the upper palmar row of bristles...... ....*Corisella* Lundblad
(See key, p 259)

Combination of characters not as above..... 8

8. (7) Length of pruinose area along claval suture less than twice the length of the distance between the shining basal apices of the corium and clavus; with the post-nodal pruinose area (as measured from the cubital angle) shorter than or barely equal to the meron; males without a strigil or a strigilar stalk.
Centrocorisa Lundblad
(See key, p 436)

Not as above 9

9. (8) Short, broad corixids, more than a third as broad as long; distal portion of corium semihyaline with color pattern often effaced; length of pruinose area along claval suture less than twice the length of the distance between the shining basal apices of the clavus and corium.... 10

Not as above 11

10. (9) Middle femora of both sexes with a longitudinal groove on the ventral surface, or with a mat of straw-colored hairs distally on the inner surface; males with a strigil.............................. .....*Pseudocorixa* Jaczewski
(See key, p. 408)

Middle femora of both sexes with ventral surface not longitudinally grooved; males without a strigil..... ....*Morphocorixa* Jaczewski
(See key, p. 422)

11. (9) Broad, compact species of moderate size, 5.7 to 6.5 mm. long; South American in distribution; color pattern as on Plate VI, wash drawings 33 and 34; male pala with the upper palmar row of bristles interrupted near distal end and with pegs inserted in opening in two of the three species; (see Plate LXIX and text figure 5). Regular peg row lying near the dorsal margin of pala ....*Neosigara* Lundblad
(See key, p. 429)

Not as above 12

12. (11) **Upper surface of male pala deeply incised; vertex of male acuminate; both sexes with palar claw serrate at base; species less than 7 mm. long, usually with hemelytral pattern indistinct or effaced..........*Ramphocorixa* Abbott**
(See key, p. 448)

Not as above 13

13. (12) **Males dextral, without a strigil; hemelytral pattern always crossbanded, but with less contrast between light and dark areas than in most corixids. (See wash drawing 28, Plate VI.) Pronotum, clavus, and corium always heavily rastrate; male palar pegs always in two rows; mesoepimeron at level of the scent gland osteole barely equal to or narrower than the lateral lobe of the prothorax; distal portion of first tarsal segment of hind leg with a brown to black infuscation at least along margins (except in *C. gebleri* and *C. audeni*) ....*Callicorixa* B. White**
(See key, p 457)

Combination of characters not as above. 14

14. (13) **Prothoracic lobe quadrate or trapezoidal; pruinose area along claval suture very short (except in *H. minorella*), in any case shorter than the post-nodal pruinose area; front tibia of male with a spiniform tuft of hairs near apex; females never with anal lobes notched on ventral inner margin as in text figure 9 .... 15**

Combination of characters not as above.. 16

15. (14) **Pronotum and hemelytra never rastrate, although anterior margin of former may sometimes be rugulose; pattern reticulate; male asymmetry sinistral and penial sheath curiously formed, dorsal surface of the hind femur with a single row of closely set pegs..... .... *Corixa* Geoffroy**
(See Plate IV)

Pronotum rastrate (except in *H laevigata*); hemelytra rastrate, at least on clavus, if nonrastrate, then with only one or two stout pegs on dorsal surface of hind femur; pattern not reticulate, except in *laevigata*, male asymmetry dextral, male penial sheath normal .. . .*Hesperocorixa* Kirkaldy
(= *Anticorixa* Jaczewski)
(See key, p. 498)

16. (14) **The mesoepimeron very broad with a secondary suture curving across it from the lateral bend to the inner anterior angle . .. ...*Xenocorixa* Hungerford**
(See Plate VIII)

The mesoepimeron, even when broad, without a secondary suture 17

17. (16) **Male asymmetry sinistral, pala with a short row of pegs at base only; both sexes with the pruinose area along the claval suture narrowing abruptly beyond the corial pruinose area for a distance at least equal to the distance between the inner and outer basal angles of the corium, *Heliocorisa* Lundblad**
(See Plate IV)

Not as above 18

18 (17) **Hemelytral pattern reticulate, hemelytra and face hairy; seventh ventral abdominal segment of females medianly incised at tip (except in *C sorensoni*, which has the anal lobes slightly incised on inner ventral margin). ... 19**

Not as above .... *Sigara* Fabricius
(See key, p. 610)

19. (18) **Elongate species with well defined median carina on pronotal disk, usually plainly visible for entire length of disk; pronotal disk from moderately to strongly rastrate; middle leg with claw equal to the tarsus (except in *A. planifrons* which has pronotum strongly rastrate and carina well defined); male pala elongate, its dorsal edge bent inward at or slightly beyond its basal third ....*Arctocorisa* Wallengren**
(See key, p 580)

Normal species with pronotal carina not so well defined, usually visible only on anterior third of disk; pronotal disk from faintly to moderately rastrate, claw of middle leg plainly longer than its tarsus; male pala broad.
***Cenocorixa* new genus**
(See key, p 564)

Ectemnostega Enderlein

1912. Enderlein, Günther. Kungl. Svenska Vetenskaps Akademiens Handlingar XLVIII, No. 3, p. 115. (Colored figure, Pl. 3, fig. 38, and text fig. 28.)

1928. Lundblad, O. Ent. Tidskrift XLVIII, Haft 4, p. 222. (Compares with *Neosigara.*)

1928. Jaczewski, T. Annales Musei Zoologici Polonici VII, pp. 53-56, Pl III.

1928. Jaczewski, T. Annales Musei Nat. Hongarici XXV, p. 214. (Reports Patagonia.)

1928. Lundblad, O. Zoolog. Anzeiger LXXIX, Haft 5-6, pp. 153-154.

1935. Poisson, R. Archives de Zool. Exp. et Gén. LXXVII, p. 458.

Medium-sized corixids with eyes relatively small and the interocular space very broad. Postocular space broad. Anterior rostral surface with transverse sulcations. Face flattened in female, concave in male; hairy in both sexes. Pronotum and hemelytra roughened, rugulose to faintly rastrate. Hemelytra with scattered fine hairs, the membrane not separated from the corium, the embolial margin emarginated, suddenly explanate before the nodal furrow in the female, but slightly so in the male. Lateral lobe of prothorax tongue-like, broadest at base, gradually tapering and rounded at the end. The tibia of the front leg of the male overlapping the base of the pala. The palar pegs of male more or less bristle-like and crowded into a double row at distal end. Metaxyphus short. Asymmetry of male dextral; strigil present.

Doctor Jaczewski says this genus appears to be primitive and nearer *Glaenocorisa* Thomson than *Cymatia* Flor.

Ectemnostega quadrata (Signoret)

(Plate XXXI, figs. 2, 2a-2h; also wash drawing No. 6, Plate IV)

1885. *Corixa quadrata* Signoret, V. Annales de la Soc Ent de France, V (ser. 6), pp. 68-69 (Desc. from "Terre de Feu, Chili.")

1888. *Corixa quadrata*, Signoret, V. Miss Cap. Horn, Hemiptera, p 6.

1895. *Corisa quadrata*, Berg, C. Anales Mus. Nac. Buen. Aires IV, p. 196. (Name only)

1897. *Corixa quadrata,* Breddin, G. Hamburger Magalhaensische Sammelreise, Hemiptera, pp. 13-14, figs. 5, 5a-c (Desc. both sexes and dimorphism.) Material collected by Doctor Michaelsen from "Magalhaens Str." and "Uschuaia."

1912. *Ectemnostega quadrata,* Enderlein, Gunther. Kungl Svenska Vetenskaps Akademiens Handlingar XLVIII, No 3, pp. 115-116. (Pl. III colored fig. 38, text fig. 28) (Studied 12 specimens taken from two ponds, one entirely covered with ice, 3-10-1902. "Halbinsel südwestlich von Uschuaia.")

1927. *Ectemnostega quadrata,* Jaczewski, T., Ent. Tidskrift, XLVIII, No. 3, pp. 146-149, figs. 1-6 (splendid redescription).

1928. *Ectemnostega quadrata,* Jaczewski, T. Annales Musei Nat Hungarici XXV, p. 214. (Reports from Patagonia.)

Size: Length 6 mm. to 6.7 mm. Width of head 2 mm. to 2.35 mm.

Color: General facies brown. Head yellow to yellowish brown, its caudal margin embrowned to black. Venter and legs yellow. The ends of middle tarsi darkened and abdominal venter of male darker than in female. The ground color of pronotum and hemelytra light brown; the pronotum crossed by eight or nine slender, broken and overlapping impressed black lines. The light brown and dark brown figures on hemelytra about equal except at base of clavus where the dark bands are a little narrower. On the remaining portions of the hemelytra the lines are less regular, zigzag-like, here and there broken up and furcated with no indication of a line between corium and membrane; embolium pale, may be darkened at nodal furrow.

Structural characteristics: Head almost equally shaped in both sexes. Frontal arch in both sexes distinctly, although not exactly strongly, prominent between the eyes, forming a somewhat flattened, slightly convex line. Synthlipsis wide, wider than an eye. Postocular space broad as in *Cymatia* and *Glaenocorisa.* Face concave in the male, flattened in the female; in both sexes densely covered with long hair. Third antennal segment twice as long as the fourth. Head, when seen from above, nearly equal in length to the pronotal disk which is about twice as wide as long. Lateral angles of pronotal disk more or less rounded. Lateral lobes of the prothorax wide at their base, gradually tapering and rounded at the end. Pronotal keel indistinct. Pronotal disk and hemelytra roughened, rugulose to faintly rastrate. Hemelytra with fine scattered hairs. Embolar margin emarginated anteriorally, suddenly explanate before the nodal furrow in the female, but slightly so in the male. Pruinose area beyond the nodal furrow rather narrow and pointed distally and equal in length to pruinose area along the claval suture. Mesoepimeron narrow with osteole of scent gland near its tip. Metaxyphus rather short, almost equilaterally triangular.

Front leg: The femur of the male sparsely armed with short spines and hairs; about the center of its front surface a more dense group of short spines, obliquely extended. Tibia distinctly swollen toward the apex and somewhat twisted there, overlapping exteriorly the base of the pala. Pala rather narrow, its upper margin with a strong tubercle at the base, further forming a somewhat irregular arch. Inner palmar margin convex with about 16 rather remotely inserted bristles. The peg row lies along the inner margin of the palm and at distal end is crowded into two rows, the lower ones long and bristle-like, the basal portion of the row consists of long white, bristle-like hairs interspersed with shorter ones. The front tibia of the female simple, pala shaped like that of the male but lacking, of course, the pegs.

Middle leg: femur : tibia : tarsus : claw :: 100 : 53.6 : 40.6 : 42.

Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 105.4 :

121.6 : 62.2. On the upper surface of the hind femur an elongated group of about 30 short spines. The strigil of the male is comparatively small, with about 6 rather irregular combs.* The male genital capsule and claspers as shown on Plate XXXI, figs. 2e, and 2g.

Location of types: The type is a male in the Paris Museum and bears the following labels: "Museum Paris, Arch. du Cap. Horn Baie Orange, Hyades and Hahn 1885" and "*Corixa quadrata* type n. sp., C. Horn. Signoret." I examined it in 1928. The specimen is a brachypterous form, having hind wings reduced. In the museum at Hamburg I found Breddin's specimens. One female labeled "130 Uschuaia, *Corixa quadrata* Sign. form volatilis nova" and "130 Uschuaia Süsswasser. See auf d. Halbinsel, 19-XI-1892. Coll. Michaelsen." This is his type of winged form. Another with reduced flight wings is labeled "form aptera." A male is also labeled "form aptera" and the genital capsule shown on Plate XXXI is from this.

Data on distribution: (Plate XXXV). The type came from Fireland. Breddin, 1897, reported on a collection in the Hamburg Museum collected by Doctor Michaelsen and recorded it as follows: "Coll. Mich. 66 Magalhaens Str., Aqua Fresco; X-92 (Delfin leg.)"; "Coll. Mich. 78 Magalhaens Str., Punta Areanas, grosser Bergsee, ca. 300 m. hoch, 10, III, 93"; "Coll. Mich. 130 Uschuaia, Süsswasser-See auf der Halbinsel 19, XI, 92"; "Coll. Mich. 131 Uschuaia Süsswasser-See auf der Halbinsel, 13, XII, 92"; "Coll. Mich. 135 Uschuaia Süsswasser-Teich vor der Halbinsel, 2, XII, 92." He described both brachypterous and fully winged forms. Enderlein, 1912, who proposed the genus, studied 12 specimens taken 3, 10, 1902, from "Halbinsel südwestlich von Uschuaia" in two fresh water ponds, one of which was entirely and the other only partly covered with ice. Jaczewski, 1928, records a male from Patagonia in the Hungarian Museum. The species is found then at the southern tip of South America in the rigorous cold climate of Tierra del Fuego, and Doctor Michaelsen collected specimens in the Antarctic summer months, taking both sexes in October and November, females and eggs on a Ceratophyllum-like plant in December and adults of the new generation in March.

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* This description drawn largely from Jaczewski, 1927.

Ectemnostega darwini n. sp.

(Plate XXXI, figs. 1, 1a-1d)

Size: Length 7.8 mm. (♀). Width across eyes 2.43 mm. (♀).

Color: General facies medium brown. Pronotum crossed by 12 to 14 narrow, very irregular brown lines, tending to coalesce laterally on the distal half of the disk. Claval lineations plainly transverse on basal third, more broken and irregular distally. Corial pattern irregularly transverse, the dark lineations much interrupted, but extending to the lateral margin of wing beyond the embolar groove. Pattern continuous over membrane. Embolium, head, limbs, and distal segments of abdomen pale; venter of thorax and basal segments of abdomen smoky.

Structural characteristics: Since the specimen we have before us is macropterous, the head is shorter than the pronotal disk. Interocular space very broad, one and one-half times the length of the rear margin of an eye; postocular space broad; vertex produced; face rather hairy, transversely depressed just above the beak, and slightly flattened.

Pronotal disk as pictured on Plate XXXI, fig. 1c. Disk and clavus moderately rastrate; corium rugulose to faintly rastrate at base; corium with a few scattered pale hairs. Post-nodal pruinose area slightly shorter than that of the claval suture. Embolar margin emarginated as in *E. quadrata* (Sign.), suddenly explanate before the nodal furrow. Lateral lobe of the prothorax broad at base, sides gradually tapering to rounded apex. Mesoepimeron narrow with osteole almost at tip. Since this specimen was pinned through the metaxyphus we cannot describe that structure.

Pala of female with 15 to 16 lower palmar hairs; distal end of pala somewhat blunter than in *E. quadrata* (Sign.). Middle and hind legs slender; hind femur as shown on Plate XXXI, fig. 1. Relative proportions of segment as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 59.9 : 48.4 : 48.4.

Hind leg: femur : tibia (last two segments missing) : : 100 : 91.1.

Venter of female abdomen as on Plate XXXI, fig. 1b.

Comparative notes: This female is a damaged specimen. I have compared it with all the *Ectemnostegella* species as well as with *Ectemnostega quadrata.* While its general facies is that of *Ectemnostegella,* the explanate margin of the hemelytra and the presence of some hairs on the shining area of the under surface of the hind femur suggest the genus *Ectemnostega.* It is somewhat intermediate between the two genera and only the discovery of males will determine its proper place. The only *Ectemnostegella* with a comparably broad postocular space is *E. jamesi* Hungerford, the surface of which is roughened and which has a coarser and more definitely transverse pattern. The pattern of *E. darwini* is like that of *Ectemnostegella pilosafrons*, from which it differs in having a broader interocular space, a much broader postocular space, and the suddenly explanate margin of hemelytron.

The differences between the females of *E. darwini* and *E. quadrata* are shown on Plate XXXI.

Location of type: Holotype female, labeled "Santa Cruz, Patagonia, C. Darwin" in the British Museum.

Data on distribution: (Plate XXXV.) Known only by the type.

PLATE XXXI

Ectemnostega Enderlein

FIG. 1. *Ectemnostega darwini* n. sp.; ventral view of hind femur of female.

FIG. 1a. Dorsal view of head of female.

FIG. 1b. Ventral view of female abdomen.

•FIG. 1c. Pronotal disk of female.

FIG. 1d. Costal margin of left hemelytron of female.

FIG. 2 *Ectemnostega quadrata* (Signoret); ventral view of hind femur of female.

FIG. 2a. Dorsal view of head of female.

FIG 2b. Ventral view of abdomen of female.

FIG. 2c. Pronotal disk of female.

FIG. 2d. Costal margin of left hemelytron of female.

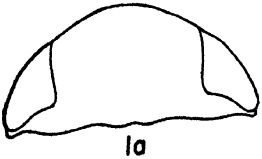
FIG. 2e. Genital capsule of male (drawn by Hungerford in Europe from the type).

FIG. 2f. Tibia and pala of male front leg (modified after Jaczewski's drawing from Hungerford's notes on the type).

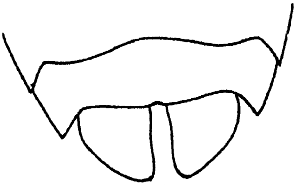
FIG. 2g. Left clasper of capsule (after Jaczewski).

FIG. 2h. Right side of male abdomen, showing strigil (after Jaczewski).

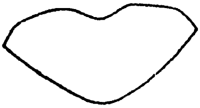
PLATE XXXI



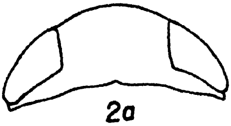
1a



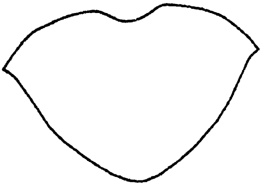
1b



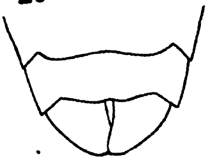
2c



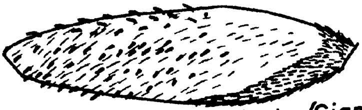
2a



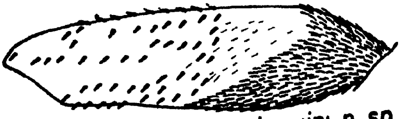
1c



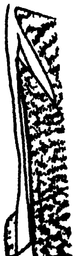
2b



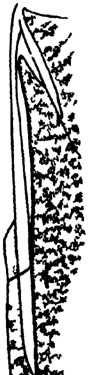
2. Ectemnostega quadrata (Sign)



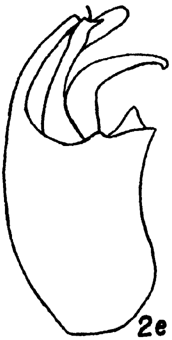
1. Ectemnostega darwini n. sp.



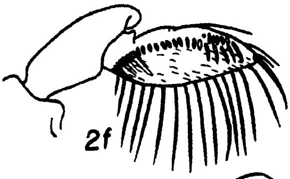
2d



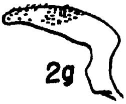
1d



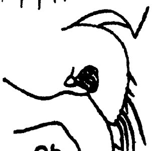
2e



2f



2g



2h

The Genus *Ectemnostegella* Lundblad

1928. Lundblad, O. Zool. Anzeiger LXXIX, Heft 5-6, p. 158.
1928. Lundblad, O. Ent. Tidskrift XLVIII, Haft 4, p. 222 (remarks).
1935. Poison, R. Archives de Zool. Exp. et Gén. LXXVII, p. 458.

Interocular space wider than an eye;* postocular space broad, at least at inner angle of the eyes. Face of female flattened and hairy; that of male, except in two species, with a deep depression and few hairs. Vertex distinctly produced in both sexes, but more so in males. Hemelytral pattern vermiculate, without a line of demarcation between corium and membrane. Lateral lobe of the prothorax with sides tapering from base to blunt apex. Tibia of front leg in male not produced over pala. Male pala with pegs at distal end crowded into a double row, basal pegs elongate and spinelike. Hind femur with the pubescent area restricted to a narrow border at base and along the rear margin; ventral surface bearing several rows of short spines on distal half in both sexes. (See fig. 2d, Plate XXXII.)

Genotype *E. montana* Lundblad.

This genus is very closely related to *Ectemnostega* Enderlein, the genotype of which occupies the southern tip of South America. *Ectemnostegella* is found in the mountainous regions of Argentina, Bolivia and Perú. A single species, new in this paper, occurs in Argentina near Buenos Aires.

KEY TO ECTEMNOSTEGELLA LUNDBLAD

1. Width of the interocular space greater than the length of the pruinose area along the claval suture.. 2
Width of the interocular space equal to or less than the length of the pruinose area along the claval suture.. 4
2. (1) Length of the pruinose area along claval suture greater than the posterior width of an eye..*E. lundbladi* n. sp (p. 207)
Length of the pruinose area along claval suture shorter than the posterior width of an eye 3
3. (2) Nodal furrow indistinct, but dividing embolar groove into two nearly equal parts; the meron about half as long as the postnodal pruinose area as measured along the costal margin.......... ...*E. jamesi* n. sp. (p. 208)
Nodal furrow distinct, situated well beyond middle of the embolar groove; the meron equal to the postnodal pruinose area as measured along the costal margin ....*E. tumidacephala* n. sp. (p. 210)
4. (1) Interocular space equal to the width of an eye.... ......*E. venturii* n. sp. (p. 211)
Interocular space greater than the width of an eye.......................... 5

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* Except in *E. venturii* n. sp. where it is only as wide as an eye, in females at least.

5. (4) Greatest width of the shining costal margin just anterior to the nodal furrow equal to the width of the postocular space at the inner angle of the eye. *E. woytkowskii* n. sp (p. 213)

Greatest width of the shining costal margin just anterior to the nodal furrow about half the width of the postocular space at the inner angle of the eye... 6

6. (5) Lateral lobe of prothorax with both margins tapering (see Plate XXXIII, fig. 3a), almost as broad at base as long; vertex of males and females not conical, even when produced 7

Lateral lobe of prothorax with anterior margin nearly straight (see Plate XXXIII, fig. 4a), longer than the base is broad; vertex of both sexes conically produced; pala of male short and broad ....*E. peruana* Jacz. (p. 214)

7. (6) Face of male very hairy; face of female depressed and very hairy; male without a stridular area at base of front femur ....*E. pilosafrons* n. sp. (p. 215)

Face of male with few hairs; face of female, if depressed, then not hairy; if hairy, then not depressed; males with a stridular area 8

8. (7) Vertex of male as on Plate XXXIII, fig. 1b; female face depressed but not hairy ....*E. stridulata* n sp. (p. 216)

Vertex of male as on Plate XXXII, fig. 1b; female face hairy but not depressed ....*E. montana* Lundblad (p. 218)

Ectemnostegella lundbladi n. sp.

(Plate XXXIV, figs 1, 1a-1d)

Size: Length 6.3 mm. to 7.3 mm. Width across eyes 2.1 mm. to 2.3 mm.

Color: General facies dark. Pronotum crossed by about 18 narrow, irregular dark lines in macropterous forms. In our collection there are no brachypterous forms; however, since both forms occur in other species of this genus, it is only reasonable to suppose that they also occur in this species. Color pattern on hemelytra appearing mottled, the dark color in short vermiculate, somewhat transverse series, and dominant over the light. Pattern of membrane continuous with that of corium, except for clear line down center of membrane in some specimens. Embolium pale to slightly infuscated; head and limbs pale; venter dark, tip of abdomen pale in some specimens.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex conically produced in both sexes; interocular space almost twice the width of an eye and its width greater than the length of the claval pruinose area; postocular space relatively narrow; male fovea broad and deep; face of male sparsely haired, that of female flattened and hairy; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 35 : 28 ♂; 1 : 2 : 3 : 4 :: 20 : 18 : 38 : 30 ♀. Pronotum with median carina visible throughout but most distinct on anterior third; pronotum finely rastrate; hemelytra rugulose, shining, with a few long, pale hairs on corium and membrane. Pruinose area of the embolar groove posterior to the nodal furrow equal in length to that of the claval suture. Length of the claval pruinose area greater than the posterior width of an eye. Lateral lobe of the prothorax broadest at base, tapering distally to rounded point. Mesoepimeron narrow with osteole near its tip; metaxyphus about as broad at base as long, pointed distally. Foreleg of female of typical shape. Foreleg of male: femur relatively slender without a stridular area and with a row of stout hairs along inner surface on distal portion; tibia with several long, spine-like hairs on inner surface and with a projection-bearing pad on distal margin; pala with 5 or 6 pegs in upper distal row and 16 short and 5 long pegs in lower row. Middle and hind legs relatively slender. Comparative measurements: middle leg: femur : tibia : tarsus : claw :: 100 : 50.1 : 38.5 : 38.5; hind leg : femur : tibia : tarsus 1 : tarsus 2 :: 100 : 90.6 : 113 : 38.8. Strigil elongate, of 1½ combs, and bearing extra long spines on inner portion as on Plate XXXIV, fig. 1b. Outer margin of the left lobe of the eighth abdominal segment incised. For details of male structures see Plate XXXIV, figs. 1, 1a-1d.

Comparative notes: This is a dark species with the dark coloration dominant over the pale. In addition, the males may be distinguished by the peculiar strigil consisting of a solid plate which bears one and a half rows of extra long spines and some stouter ones mesally from the anterior end of the strigil.

Location of types: Holotype male, allotype female, 9 male and 20 female paratypes labeled "Peru, S. A., Dept. of Huanuco, vic. of Shishmay, Andes 3600-4100 m., highland lakes, Sept. 15-20, 1937, F. Woytkowski"; all forms macropterous.

Data on distribution: (Plate XXXV.) Besides the type series we have the following records (all macropterous):

PERU, SOUTH AMERICA: Dept. of Junin, lakes 10 km. n. w. of Huasakuasi, 4,100 m. above sea level, April 14, 1940, F. Woytkowski, 29 males, 30 females (these specimens heavily parasitized); Dept. of Ayachuco, Prov. Huanta, Andes, 2,800 m. above sea level, from ponds, Mar. 20, 1941, F. Woytkowski, 2 males, 1 female.

Ectemnostegella jamesi n. sp.

(Plate XXXIII, figs. 2, 2a-2c)

Size: Length 6.5 mm. Width across eyes 2.2 mm.

Color: General facies medium brown, head testaceous. Pronotum crossed by 8 to 10 very narrow, irregular dark lines, much more broken and irregular on distal than on basal portion. Clavus with darker pattern almost obliterated on basal portion; elsewhere on clavus and on corium pattern is almost continuous across sutures and about equally distributed between dark and light, except at distal end of embolar groove and inner distal angle of corium which are dark. Membranal pattern continuous with that of corium. Pattern of hemelytra irregular throughout, but more or less transverse in thin, wavy, dark lines. Limbs and thorax testaceous; basal segments of abdomen almost black, distal segments and margins pale testaceous.

Structural characteristics: Flight wings reduced. Head about one and one-half times as long as pronotal disk; interocular space a little greater than the width of an eye and its width greater than the length of the claval pruinose area; postocular space very broad (see fig. 2b, Plate XXXIII); vertex rounded and considerably produced; face of male flattened only, the fovea barely distinguishable; face quite hairy. Antennal segmentation: 1 : 2 : 3 : 4 :: 15 : 20 : 45 : 20 ♂. Pronotum a little more than twice as broad as long, slightly carinate basally on median portion; pronotum and hemelytra so heavily rastrate as to appear pebbled; hemelytra without hairs. Embolium with nodal furrow indistinct; it can be detected, however, and divides the embolar groove into two equal parts. The pruinose area beyond the nodal furrow about twice as long as that of claval suture. Length of the claval pruinose area shorter than the posterior width of an eye. Lateral lobe of prothorax broad at base, tapering distally, apex rounded; mesoepimeron narrow with osteole near its end; metaxyphus a little longer than broad, pointed distally. Foreleg of male: femur relatively stout, without a strigilar area, and with several stout hairs on distal portion of inner surface; tibia with several long, spinelike hairs on inner surface and with a pad distally beneath a distinct ledge; pala with 9 pegs in upper distal row, and with 7 to 8 long and 14 to 15 short pegs in lower row. (See fig. 2, Plate XXXIII.) Middle leg relatively stout, with long, slender hairs on anterior margin; hind leg moderately stout; comparative measurements: Middle leg: femur : tibia : tarsus : claw :: 100 : 37.7 : 29.9 : 37.7; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 83.9 : 111.8 : 44.3. Strigil large, triangular, of 7-8 combs. For details of male structures, see Plate XXXIII, figs, 2, 2a, 2b and 2c.

Comparative notes: This species can be distinguished from all others in the genus by having the nodal furrow indistinct and dividing the embolar groove into two nearly equal parts. Like *E. pilosafrons* n. sp., this species has a shallow fovea and a hairy face in the male, but may be distinguished from the above-mentioned species by the characteristics listed above.

Location of types: Holotype male (brachypterous), labeled "Lake Titicaca, Bolivia, Jan. 18, 1936, H. M. James," in the Francis Huntington Snow Entomological Collections, University of Kansas, Lawrence, Kansas.

Data on distribution: (Plate XXXV.) Known only by the type.

Ectemnostegella tumidacephala n. sp.

(Plate XXXIV, fig. 2, 2a-2d)

Size: Length 5.3 mm. Width across eyes 1.8 mm. Width across pronotum 1.6 mm.

Color: General facies very dark. Pronotum dark, crossed by six or eight obscure pale lines, very irregular. Dark pattern of hemelytra dominant and arranged in somewhat transverse series, especially on clavus. Pattern of membrane continuous with that of corium. Dorsum of head dark, with a median brown stripe; venter of head, limbs, and thorax pale; abdominal venter and embolium dark.

Structural characteristics: Macropterous. Head almost as long as the pronotal disk and considerably wider; postocular space broad at inner angles of eyes; interocular space only slightly greater than the width of an eye and its width greater than the length of the claval pruinose area; vertex produced; eyes protuberant; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 35 : 20 ♂. Pronotum with median carina faintly visible on anterior margin. Pronotum and hemelytra shining, faintly rugulose. Nodal furrow distinct; pruinose area of the embolar groove posterior to the nodal furrow about equal to that of the claval suture. Length of the claval pruinose area shorter than the posterior width of an eye. Lateral lobe of the prothorax broadest at base, tapering to tip; mesoepimeron narrow with osteole near the tip; metaxyphus as broad as long. Foreleg of male: femur slender, with a row of spine-like hairs along inner surface; tibia slender with 2 or 3 long hairs on inner surface and a projection-bearing pad on distal margin; pala spoonlike with 4 pegs in upper distal row and 5 long and 15 short pegs in lower row. Middle and hind legs relatively slender; comparative measurements of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 51.6 : 39.3 : 43.

Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 97 : 121.2 :

45.5. For details of male structures see Plate XXXIV, figs. 2, 2a, 2b, 2c, and 2d. The strigil has two combs of nearly equal length. Outer margin of left lobe of eighth segment incised.

Comparative notes: This species can readily be distinguished from its fellows by having the head considerably wider than the pronotal disk and protuberant eyes.

Location of types: Holotype male, in the Francis Huntington Snow Entomological Collections, University of Kansas, Lawrence, Kansas.

Data on distribution: (Plate XXXV.) Described from one macropterous male specimen taken Dept. of Huanuco, vic. of Shishmay, Andes, 3,600-4,100 m., highland lakes, Perú, Sept. 16-20, 1937, Felix Woytkowski.

Ectemnostegella venturii n. sp.

(Text fig 3, p 212)

Size: Length 5.7 mm. to 6.2 mm. females. Width across eyes 1.97 mm. to 2.2 mm. females. The smaller female is brachypterous, the larger macropterous.

Color: General facies medium to rather dark. Pronotum crossed by 11 to 14 narrow, irregular dark lines which appear depressed. Clavus and corium with dark pattern fine and irregularly transverse. Dark pattern on base of membrané transverse, continuous with that of corium; pattern on distal portion reticulate; membrane indistinctly separated from the corium. Prenodal portion of embolar groove smoky to black in macropterous form, pale throughout in brachyterous form. Head and limbs pale in both forms; venter pale in brachypterous specimen, smoky to black in the other.

Structural characteristics: Head (brachypterous form) as compared to pronotal disk :: 1.5 : 2; macropterous form :: 1.5 : 2.5. Postocular space moderately broad and of uniform width to lateral curve of eye; interocular space equal to the width of an eye and its width less than the length of the claval pruinose area; vertex rounded; face hairy, depressed and rather short; antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 18 : 38 : 22 ♀. Width of pronotal disk to length (brachypterous form) :: 100 : 47.6; macropterous form :: 100 : 52.3. Pronotum and clavus finely rastrate; basal portion of corium rugulose to faintly rastrate; membrane and distal portion of corium shining. Postnodal pruinose area equal in length to that of the claval suture. Lateral lobe of prothorax about as broad at base as long, sides tapering, tip oblique with anterior angle longer than posterior angle; mesoepimeron narrow with osteole almost at tip; metaxyphus as broad as long, sides tapering to bluntly pointed apex. Front leg of female normal, the pala with 18 to 20 lower palmar hairs. Middle and hind legs relatively slender; hind femur pubescent at base, glabrous portion with pegs confined to distal half (see text figure); proportions of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 43.5 : 30.45 : 36.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.2 : 107.5 : 35.8. Female abdomen normal; the seventh ventral segment with distal margin almost straight and anal lobes short.

Comparative notes: The fact that the interocular space is equal to the width of an eye will separate this species from the *Ectemnostegella* species thus far described.

Location of types: Holotype female labeled "Rep. Argentina, Prov. Buenos Aires, Sept. 26, 1898, S. Venturi," in the Museo Nacional de Historia Natural, Buenos Aires. One female paratype with same data in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XXXV.) Known to us only by the type series.

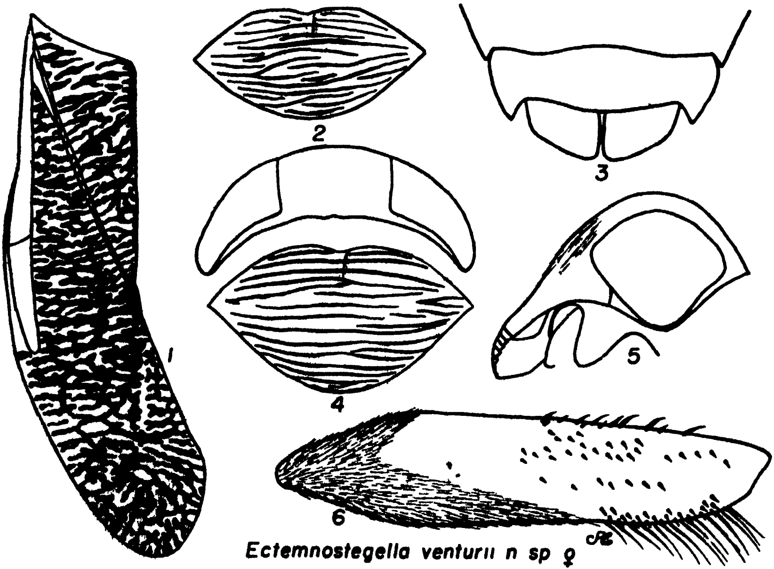

FIG. 3. *Ectemnostegella venturii* n. sp. (1) left hemelytron of female; (2) pronotal disk, brachypterous form; (3) ventral view of female abdomen; (4) head and pronotal disk, macropterous form; (5) lateral view of head; (6) venter of hind femur.

Ectemnostegella woytkowskii n. sp.

(Plate XXXII, figs. 3, 3a to 3c)

Size: Length 7.4 mm. to 7.8 mm. Width across eyes 2.2 mm. to 2.6 mm.

Color: General facies a little lighter than medium. Pronotum crossed by about a dozen narrow, irregular dark lines. Pattern on basal portion of clavus transverse; pattern elsewhere more broken and irregular, with light coloration dominant over the dark. Corium and membrane not separated. Embolium, head, and limbs pale; venter pale in females, usually dark in males.

Structural characteristics: Brachypterous. Head slightly longer than the pronotal disk; postocular space rather broad; interocular space not greatly exceeding the width of an eye, and its width less than the length of the claval pruinose area; vertex of male conically produced, that of female produced but rounded; male fovea broad and deep; vertex of male pointed in lateral view; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 25 : 20 : 38 : 20 ♂ ; 1 : 2 : 3 : 4 :: 30 : 20 : 40 : 20 ♀ . Pronotum without a median carina; pronotum and hemelytra heavily rastrate, appearing pebbled. Pruinose area of the embolar groove posterior to the nodal furrow only about half as long as that of the claval suture. Greatest width of the shining costal margin of wing just anterior to nodal furrow equal to the width of the postocular space at the inner angle of the eye. Lateral lobe of the prothorax about as broad at base as long, tapering to tip. Mesoepimeron narrow with osteole near the tip; metaxyphus arrow-shaped, slightly longer than broad. Foreleg of female of usual shape. Foreleg of male: femur rather stout, base pilose, inner surface with a short row of short, spinelike hairs; tibia rather stout and broad in dorsal view, without spines or pad; pala spoon-shaped with distal portion expanded and broadened as viewed from the end, 5 pegs in upper distal row, and 3 long and 13 short pegs in lower row. Middle and hind legs relatively slender; hind femur with numerous short spines on distal half of ventral surface. Comparative measurements of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 42.5 : 34.3 : 37; hind leg: femur · tibia : tarsus 1 : tarsus 2 :: 100 : 85.7 : 119 : 40.5. Strigil small, of 3 combs. For details of male structures see Plate XXXII, figs. 3, 3a, 3b, and 3c.

Comparative notes: In this species the greatest width of the shining costal margin just anterior to the nodal furrow is equal to the width of the postocular space at the inner angle of the eye, by which characteristic it may be distinguished from others in the genus.

Location of types: Holotype male, allotype female, and 20 male and 12 female paratypes, labeled "near Concepción, Andes, 3,260 m. above sea, near or in Río Mantaro, Perú, S. A., April 7-8, 1935, Felix Woytkowski," in the Francis Huntington Snow Entomological Collections, University of Kansas, Lawrence, Kansas.

Data on distribution: (See Plate XXXV.) Known only by the types series.

Ectemnostegella peruana Jacz.

(Plate XXXIII, figs 4-4a, Plate XXXII, figs 2, 2a-2d; Plate XXXIV, fig. 4)

1933. *Ectemnostegella peruana* Jaczewski, T. Ann. Mus. Zool. Polonici IX, No. 21, pp. 329-331, Pl. XLVI, figs. 1, 3-5

Size: Length 5.9 mm. to 6.8 mm. Width across head 1.8 mm. to 2.1 mm.

Color: General facies medium brown. Pronotum in brachypterous form with about 12 narrow, irregular crossbands; in macropterous form with about 15 to 16 narrow, irregular crossbands. Dark pattern at base of clavus entire and transverse; elsewhere on hemelytra the dark pattern consisting of narrow, irregular maculations, more or less transverse, and about equal in distribution to the pale areas; dark pattern a little thicker on corium and membrane than on clavus where pale coloration is plainly dominant. No membranal line present. Head, limbs and embolium pale; venter dark.

Structural characteristics: Head a little longer than the pronotal disk in brachypterous forms; in macropterous forms slightly shorter than the disk; postocular space broad at inner angle of eyes; interocular space considerably broader than the width of an eye and its width equal to or less than the length of the claval pruinose area; vertex conically produced in both sexes; vertex of male pointed in lateral view, fovea broad and deep, attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 12 : 32 : 18 ♂ ; 1 : 2 : 3 : 4 :: 25 : 15 : 35 : 20 ♀. Pronotum without a carina; pronotum finely rastrate, hemelytra faintly rugulose, shining. Pruinose area of the embolar groove posterior to the nodal furrow equal in length to that of the claval suture in males; in females, shorter than that of the claval suture. Lateral lobe of the prothorax longer than base is broad and with anterior margin nearly straight; mesoepimeron narrow with osteole near the tip; metaxyphus about as broad at base as long, arrow-shaped. Foreleg of female of typical shape. Foreleg of male: femur relatively slender with a raised place on inner surface covered with fine hairs; tibia slender with a pad on distal margin; pala short and broad, with 5 or 6 long pegs in upper distal row, and 7 long and 11 or 12 short pegs in lower row. Middle and hind legs slender. Comparative measurements of segments as follows: middle leg: femur : tibia : tarsus : claw :: 100 : 51.7 : 38.3 : 42.4; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 95.6 : 107.4 : 48.5.* Strigil rounded, of 4 regular combs. For details of male structures see Plate XXXII, figs. 2, 2a, 2b, 2c and 2d. Dorsal view of female abdomen as on Plate XXXIII, fig. 4.

Comparative notes: The short broad pala of the male and the shape of the prothoracic lateral lobe will distinguish this species.

Location of types: Described from 2 males, 9 females from Perú, Santa Rosa de Ocopa, 3,270 m. above sea level, all brachypterous, and 1 male and 3 females, Perú, Huancayo, about 3,000 m. above sea level, all brachypterous. A male from Santa Rosa de Ocopa was chosen as holotype. Types in the Polish Museum at Warsaw.

Data on distribution: (Plate XXXV.) In the Snow Collections we have the following specimens:

PERU, SOUTH AMERICA: Near Concepción, Andes, 3,260 meters, Río Mantaro, April 13-15, 1935, Felix Woytkowski, 13 males (4 macropterous), 22 females (4 macropterous).

Ectemnostegella pilosafrons n. sp.

(Plate XXXIV, figs 3, 3a-3d)

Size: Length 7 mm. to 7.6 mm. Width across eyes 2.1 mm. to 2.3 mm.

Color: General facies medium brown. Pronotum of macropterous form with about 14 narrow, irregular dark lines. (No brachypterous form in collection.) Clavus with dark pattern transverse on basal portion; elsewhere on clavus and on corium dark pattern consists of short, irregular, faintly transverse, vermiculate lines, a little narrower than intervening pale areas so that the latter are dominant. Pattern of membrane continuous with that of the corium. Embolium infuscated at least on basal third and sometimes throughout. Head and limbs pale, venter black.

Structural characteristics: Macropterous. Head two-thirds as long as pronotal disk; postocular space relatively narrow; interocular space only a little greater than the width of an eye and its width less than the length of the claval pruinose area; vertex, from above,

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* Jaczewski's figures. Our specimens show considerable variation. The claws of middle leg often shorter than tarsus.

only slightly produced; male vertex in lateral view rounded, the fovea barely distinguishable; face hairy in both sexes, that of female depressed; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 35 : 20 ♂ ; 1 : 2 : 3 : 4 :: 20 : 18 : 38 : 20 ♀ . Pronotum with median carina faintly visible on anterior portion. Pronotum finely rastrate, hemelytra rugulose. Pruinose area of the embolar groove posterior to the nodal furrow slightly shorter than that of the claval suture. Lateral lobe of the prothorax broad basally, tapering to tip. Mesoepimeron narrow with osteole near its tip. Metaxyphus arrow-shaped, about as broad at base as long. Foreleg of female of usual shape. Foreleg of male: femur relatively slender, with pilose area on inner surface near base succeeded by row of spine-like hairs; tibia slender, with some spines and with a projection-bearing pad distally; pala spoon-shaped with 5 to 6 long pegs in upper distal row, and with 6 to 7 long and 14 to 16 short pegs in lower row. Middle and hind legs relatively slender. Comparative segmentation as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 48.9 : 36.9 : 39.4; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 96.4 : 120.7 : 39.9. Strigil of moderate size, 4 or 5 combs. For details of male structures see Plate XXXIV, figs. 3, 3a, 3b, 3c and 3d.

Comparative notes: The males of this species are readily distinguished from all their fellows except *E. jamesi* n. sp. by having a shallow fovea and a hairy face; from *jamesi* the males may be separated by having a distinct nodal furrow and a narrow postocular space. Females may be distinguished from those of *stridulata* n. sp. and *peruana* Jacz. by having the interocular space only slightly greater than the width of an eye.

Location of types: Holotype male, allotype female, and 13 male and 12 female paratypes, labeled "Cajamarca, *Perú*, river Chonta, June 11, 1946, F. Woytkowski," all macropterous, in the Francis Huntington Snow Entomological Collection, University of Kansas, Lawrence, Kansas.

Date on distribution: (Plate XXXV.) Known only by the type series.

Ectemnostegella stridulata n. sp.

(Plate XXXIII, figs. 1, 1a-1c, 3; wash drawing No. 3, Plate IV)

Size: Length 6.7 mm. to 7 mm. Width across eyes 1.9 mm. to 2.2 mm.

Color: General facies medium brown. Pronotum crossed by 15 or 16 narrow, broken, irregular dark lines. Dark pattern somewhat etched out on inner basal angle of clavus. Pattern elsewhere on hemelytra of short, irregular, dark maculations about equal in area to pale markings. Membrane and corium not separated. Embolium, head and limbs pale. Venter dark.

Structural characteristics: Macropterous. Head about four-fifths as long as the pronotal disk; postocular space broad at inner angles of eyes; interocular space only slightly greater than the width of an eye and its width less than the length of the claval pruinose area; vertex of male considerably produced in dorsal view and appearing pointed in lateral view; vertex of female slightly produced; face of female hairy, face of male not hairy; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 18 : 32 : 20 ♂ ; 1 : 2 : 3 : 4 :: 20 : 18 : 35 : 20 ♀ . Pronotum with faint median carina on anterior margin. Pronotum finely rastrate, hemelytra rugulose. Pruinose area of the embolar groove posterior to nodal furrow slightly shorter than that of the claval suture. Lateral lobe of the prothorax tapering from base to apex and nearly as broad basally as long; mesoepimeron narrow with osteole near the tip; metaxyphus about as broad as long, arrow-shaped. Foreleg of female normal. Foreleg of male: femur relatively stout, with a slight stridular area, though not so pronounced as in *E. montana* Lundbl.; tibia slender, without spines or pad; pala spoonlike, dorsal side somewhat flattened, with 5 pegs in upper distal row, and 4 to 5 long and 12 short pegs in lower row. Middle and hind legs relatively slender. Proportional measurements as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 48.3 : 35.4 : 35.4; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 90.9 : 107.8 : 44. Strigil minute, of 3 combs. For details of male structure see Plate XXXIII, figs. 1, 1a, 1b, 1c and 3.

Comparative notes: This species is nearest to *E. peruana* Jacz. from which it is distinguished in the males by having a longer, more slender pala and a stridular area on the forefemur, and in the females by the shape of the eighth abdominal segment, and the depressed face.

Location of types: Holotype male, allotype female, and 32 male and 31 female paratypes in the Francis Huntington Snow Entomological Collections. This series bears the following label: "Perú, S. A., Apr. 7-8, 1935, F. Woytkowski, near Concepción, Andes, 3,260 m. above sea level, near or in Río Mantaro."

Data on distribution: (Plate XXXV.) Besides the types we have:

PERU, SOUTH AMERICA: "Dept. Ayacucho, Prov. La Mar, San Miguel, 2,400 m. above sea level, Jordan R., weak current, June 2-4, 1941, Felix Woytkowski, No. 4213," 23 males, 17 females.

"Dept. Ayacucho, Prov. La Mar, San Miguel, 3,400 m. above sea level, mountain stream Torobamba, July 9-12, 1941, F. Woytkowski, No. 4213a," 30 males, 37 females.

Dept. Arequipa, Spring Creek, Cailloma, Aug. 25, 1939, F. M. Mag. Exp., K. P. Schmidt (Field Mus. Coll.), 8 males, 3 females.

Ectemnostegella montana Lundblad

(Plate XXXII, figs. 1, 1a-1c)

1928. *Ectemnostegella montana* Lundblad, O. Zool. Anzeiger LXXIX, Heft 5-6, pp. 149-153, figs. 1-5. (Desc. from Argentina.)

1938. *Ectemnostegella montana*, Jaczewski, T. Ann. Mus. Zool. Polonici IX, Nr. 21, p. 329. (Records Peru. Santa Rosa de Ocopa, 3,270 m. a. sea level.)

Size: Length 6.5 mm. to 7.7 mm. Width across eyes 2.1 mm. to 2.3 mm.

Color: General facies medium brown. Pronotum in macropterous forms crossed by about 16 narrow, irregular brown lines, in brachypterous forms by about 12. Head, limbs and embolium pale; venter dark. Dark pattern etched away on base of clavus; elsewhere, dark pattern in short, wavy, vermiculate lines, arranged in somewhat transverse series. Pale color dominant over the dark.

Structural characteristics: Interocular space only slightly exceeding the width of an eye and its width less than the length of the claval pruinose area; postocular space relatively broad at inner angle of eyes; vertex produced in both sexes, male vertex rather rounded in lateral view; male fovea broad and deep; face of male sparsely haired, that of female considerably more hairy; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 38 : 18 ♂; 1 : 2 : 3 : 4 :: 20 : 18 : 40 : 20 ♀. Pronotum with median carina visible on anterior portion; pronotum and hemelytra heavily rastrate, appearing pebbled. Pruinose area of the embolar groove posterior to the nodal furrow about equal in length to that of the claval suture. Lateral lobe of prothorax about as broad at base as long, sides tapering to blunt apex. Mesoepimeron narrow with osteole near the tip; metaxyphus longer than broad, arrow-shaped. Foreleg of female normal. Foreleg of male: femur stout, inner base somewhat produced and bearing about 12 rows of stridulatory pegs, followed by several rows of long silky hairs; tibia slender without a pad or spines; pala long and slender, with 5 pegs in upper distal row, and 5 long and 11 short pegs in lower row; pala slightly carinate at base on posterior side.

Middle leg relatively stout, hind leg slender. Comparative measurements as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 42.8 : 33.1 : 38.1; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 86.7 : 113.8 : 33.1. Strigil minute, of 3 combs. For details of male structures see Plate XXXII, figs. 1, 1a, 1b, and 1c.

Comparative notes: The males of Lundblad's species may be distinguished by having a pronouced stridular area on the forefemur. The hairy, undepressed face of the females will separate them from the females of *E. stridulata* n. sp.

Location of types: Described by Lundblad from many specimens in the Berlin Museum taken by J. Steinbach in Salta Province, Argentina, at altitude of 2,500 m. above sea level.

Data on distribution: (Plate XXXV.)

ARGENTINA: Salta Province. 2,500 m. above sea level. (Type series.)

PERU: Santa Rosa de Ocopa, 3,270 m. above sea level. 1 male (brachypterous), 1 female (macropterous) (Jaczewski, 1933).

Our collections contain the following specimens:

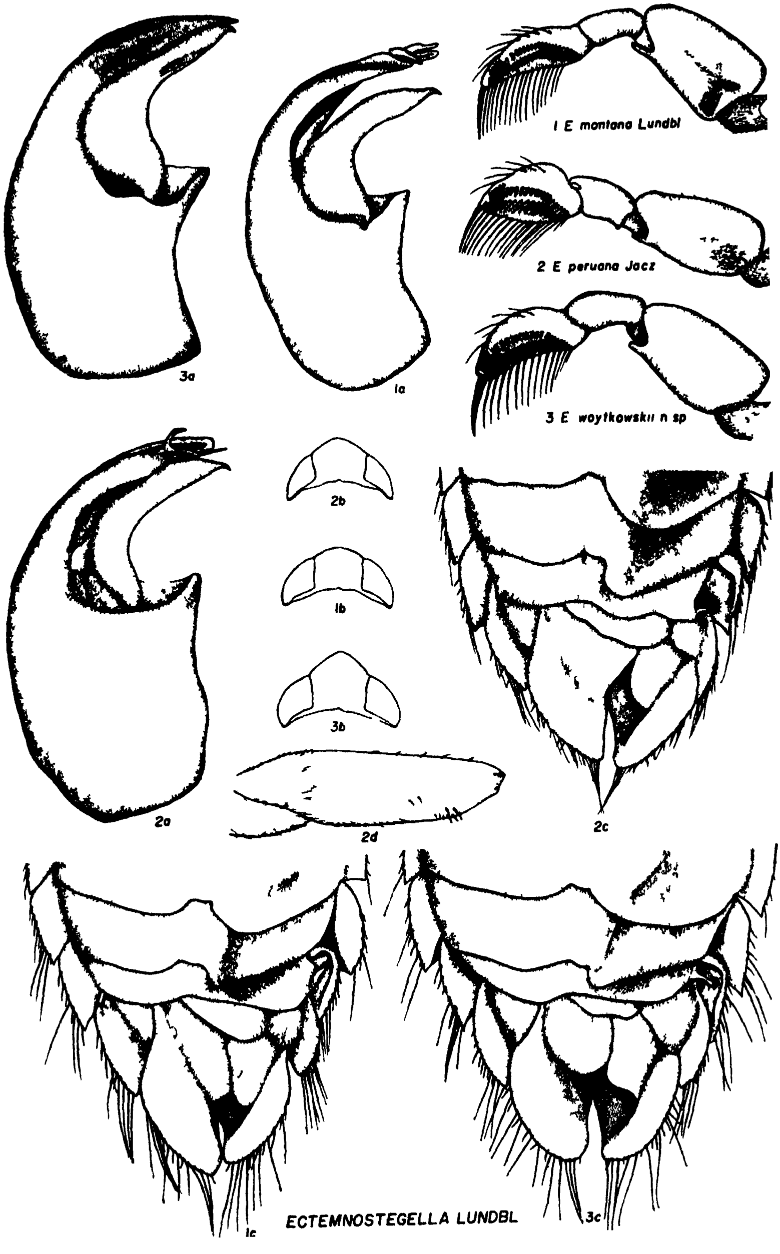
BOLIVIA: Colomi, April, 1938, A. M. Olalla, 111 males, 133 females; Dept. Cochambamba, Mte. Tunari, Liriuni, Jan. 1939, A. M. Olalla, 15 males, 13 females.

PLATE XXXII

Ectemnostegella Lundblad

FIG. 1. *Ectemnostegella montana* Lundblad; front leg of male
FIG. 1a. Genital capsule of male
FIG. 1b. Head of male.
FIG. 1c. Dorsal view of male abdomen
FIG. 2. *Ectemnostegella peruana* Jaczewski; front leg of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Head of male.
FIG. 2c. Dorsal view of male abdomen.
FIG. 3. *Ectemnostegella woytkowskii* n. sp.; front leg of male.
FIG. 3a. Genital capsule of male.
FIG. 3b. Head of male.
FIG. 3c. Dorsal view of male abdomen.

PLATE XXXII



ECTEMNOSTEGELLA LUNDBL

PLATE XXXIII

Ectemnostegella Lundblad

FIG. 1. *Ectemnostegella stridulata* n. sp ; front leg of male

FIG. 1a. Dorsal view of male abdomen.

FIG. 1b. Head of male.

FIG. 1c. Genital capsule of male.

FIG. 2. *Ectemnostegella jamesi* n. sp.; front leg of male

FIG. 2a. Dorsal view of male abdomen.

FIG. 2b. Head of male.

FIG. 2c. Genital capsule.

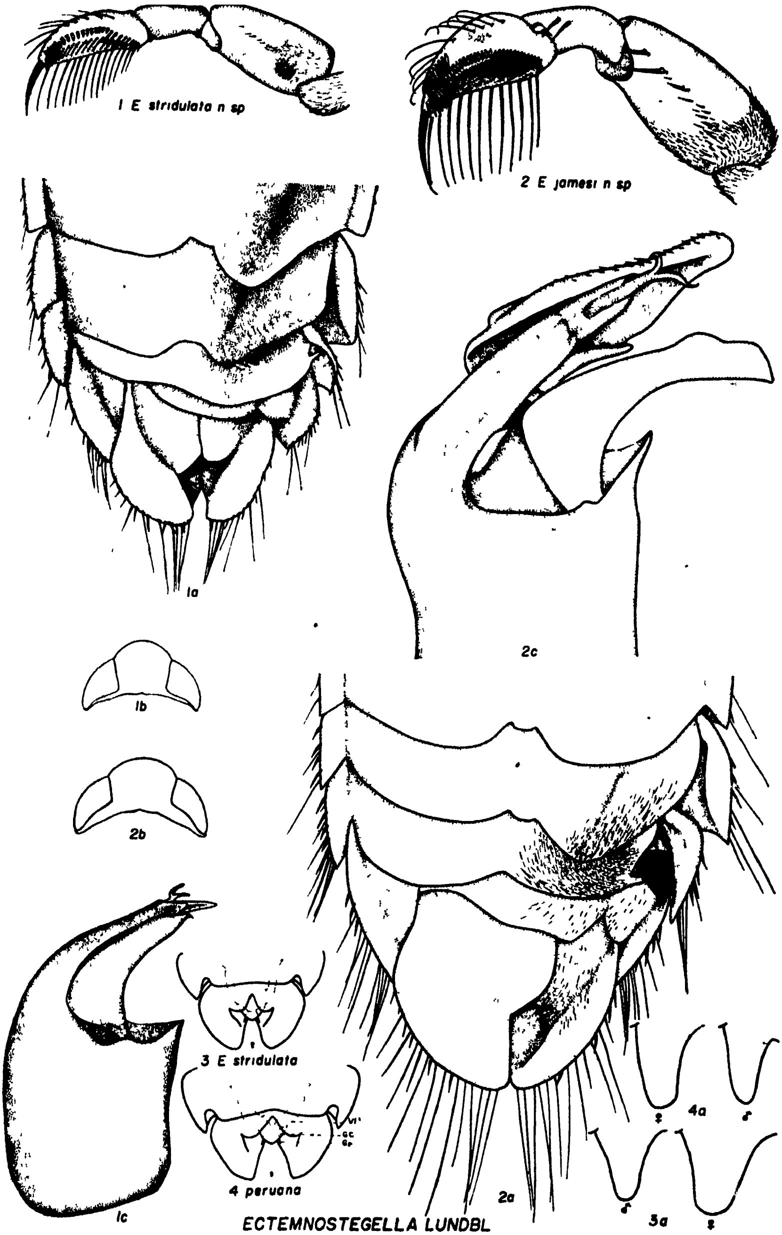
FIG. 3. *Ectemnostegella stridulata* n. sp ; dorsal view of female abdomen (cleared).

FIG. 3a. Prothoracic lateral lobes of male and female.

FIG. 4. *Ectemnostegella peruana* Jaczewski; dorsal view of female abdomen (cleared).

FIG. 4a. Prothoracic lateral lobes of male and female

PLATE XXXIII



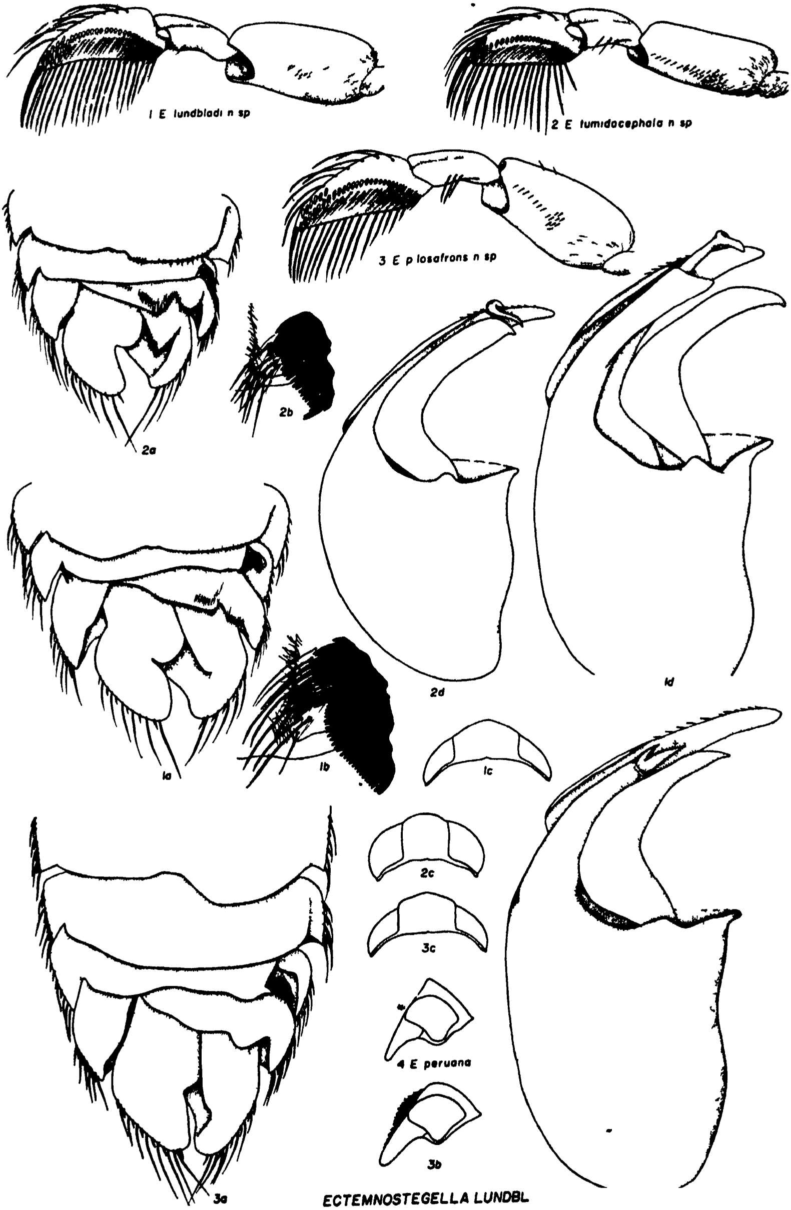
ECTEMNOSTEGELLA LUNDBL

PLATE XXXIV

Ectemnostegella Lundblad

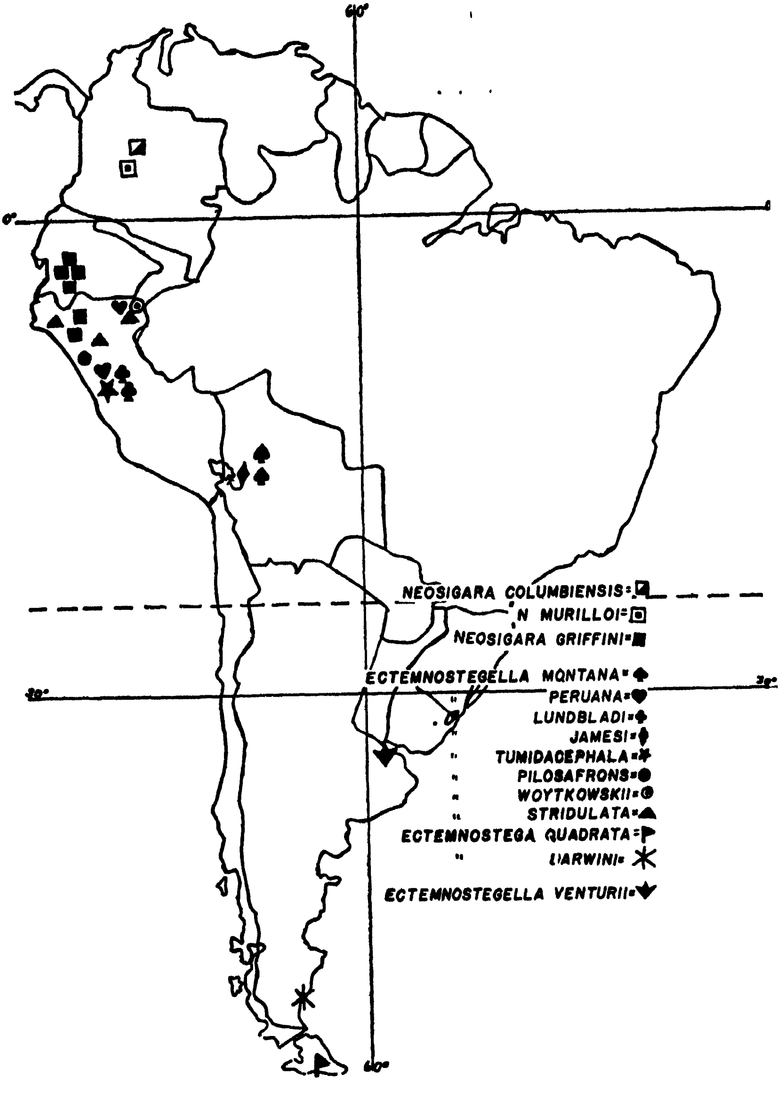
FIG 1. *Ectemnostegella lundbladi* n sp.; front leg of male.
FIG. 1a. Dorsal view of male abdomen.
FIG. 1b. Enlargement of strigil.
FIG. 1c. Head of male.
FIG. 1d. Genital capsule of male.
FIG. 2. *Ectemnostegella tumidacephala* n. sp.; front leg of male.
FIG. 2a. Dorsal view of male abdomen.
FIG. 2b. Enlargement of strigil.
FIG. 2c. Head of male.
FIG. 2d. Genital capsule of male.
FIG. 3. *Ectemnostegella pilosafrons* n. sp.; front leg of male.
FIG. 3a Dorsal view of male abdomen.
FIG. 3b. Lateral view of head of male.
FIG. 3c. Head of male, dorsal view.
FIG. 3d. Genital capsule of male.
FIG. 4. *Ectemnostegella peruana* Jaczewski; lateral view of head of male.

PLATE XXXIV



ECTEMNOSTEGELLA LUNDBL

PLATE XXXV


60°
0°
30°
30°
60°
NEOSIGARA COLUMBIENSIS = ◩
N MURILLOI = ▣
NEOSIGARA GRIFFINI = ■
ECTEMNOSTEGELLA MONTANA = ♠
" PERUANA = ♥
" LUNDBLADI = ♣
" JAMESI = ♦
" TUMIDACEPHALA = ✱
" PILOSAFRONS = ●
" WOYTKOWSKII = ◉
" STRIDULATA = ▲
ECTEMNOSTEGA QUADRATA = ⚑
" DARWINI = ✳
ECTEMNOSTEGELLA VENTURII = ▼

Krizousacorixa Hungerford

1930. Hungerford, H. B Pan-Pacific Entomologist, VII, No. 1, p. 22. (New genus for *Corixa femorata* Guérin which is the genotype.)
1931. Jaczewski, T. Annales Musei Zoologici Polonici IX, Nr 15, p. 207.
1933. Ancona, H. L. Anales del Instituto de Biologia, IV, No. 1, pp. 51-69.
1935. Poisson, R. Archives de Zool. Exp. et Gén, LXXVII, p 458, 470
1943. Walton, G. A. Trans. Soc. for British Entomology VIII, p. 157 (as subg. of *Trichocorixa* Kirk).

Inner angle of eyes acutely produced in both sexes. Infraocular portion of genae very broad. Rostrum small, transversely wrinkled. Fourth segment of antenna less than half the length of the third. Surface of pronotum and hemelytra almost smooth, surface moderately hairy. Embolium shallow. Hind wings often brachypterous. Hemelytra with reticulate pattern, membranal suture marked by a more or less distinct pale line. The pruinose area of the embolar groove posterior to the nodal furrow long, nearly half the length of the cubital ridge and longer than the pruinose area along the claval fold. Pronotum of male inflated, without carina. The lateral lobe of the prothorax somewhat linguiform, broader at base than at tip, bulged on the anterior lower margin to accommodate the base of the front coxa, the superior margin partly hidden and depressed by the inflated mesoepimeron. Legs comparatively short. Anterior femur of male greatly inflated with pronounced stridular peg field on its expanded base. Tibia of normal length without a pad. The basal half of the anterior margin of hind femur pubescent. Males with dextral asymmetry and strigil but cases of reversal common.

Genotype: *C. femorata* Guérin-Méneville.

Comparative notes: The smooth surface is like that of *Corisella*, from which even the females are readily distinguished by the acutely-produced inner angle of the eyes.

Distribution: This genus has been taken only in Mexico. The two species may be separated as follows:

A Pala of male as in figure 6 on Plate XXXVI. Head of male inflated
* Female vertex usually produced as in figure 4 .. ..*K femorata* (Guérin)
(See p. 227)

AA. Pala of male as in figure 5 on plate XXXVI. Head of male less inflated
Female vertex less produced as in figure 1... .... *K. azteca* Jaczewski
(See p 231)

Krizousacorixa femorata (Guérin)

(Plate XXXVI, figs 2, 4, 6, 8, 10, 11; wash drawings 29 and 30, Pl. VI)

1857. *Corixa femorata* Guérin-Méneville, F. E Le Moniteur Universel--Journal officiel de l'Empire Français, Numéro 330, p. 1298, 26 Novembre 1857.
1857. *Corixa femorata*, Guérin-Méneville, F. E. Revue et Magasin de Zoologie, 2nd ser., Tome IX, pp 522-527, 1857. Paris

* Jaczewski states that females are very difficult to separate and indeed we find no fixed reliable character for their separation.

1857. *Corixa femorata*, Guérin-Méneville, F. E Bulletin Soc. Zool. Acclim IV, p. 581.

1858. *Corixa femorata*, Guérin-Méneville, F. E L'Illustration Tome XXXII, Juillet 17, 1858. (Gives drawings of adult, front leg of male, and eggs)

1858 *Corixa femorata*, Guérin-Méneville, F. E. Bulletin Soc. Ent. Fr. (8) V, p. CXLVIII-CLI.

1901. *Corixa femorata*, Champion, G. C Biologia Centrali-Americana Rhynchota II, p 381. (Makes *C. femorata* Guér. a synonym of *C. abdominalis* Say in error.)

1925. *Arctocorixa femorata* (Guér.) Hungerford, H. B Bull. Brooklyn Ento Soc., XX, p. 21, pl. I. (A valid species not syn. of *C. abdominalis* Say.)

1929. *Corixa femorata* Guérin, Hungerford, H. B. Pan-Pacific Ento., VI, No. 2, pp 73-77. (Reports finding types in National Museum, Paris)

1930 *Krizousacorixa femorata*, Hungerford, H. B Pan-Pacific Ento , VII, No. 1, p 22. (Figures male genital capsule and front leg)

1931. *Krizousacorixa femorata*, Jaczewski, T. Annales Musei Zoologici Polonici, Tome IX, Nr. 15, p. 207, Pl. XXVII, figs 32-39, Pl XXIX, fig 64.

1933 *Krizousacorixa femorata*, Ancona, H. L Anales del Instituto de Biologia, T IV, No 1, pp. 65-68, figs. 9-11, 17c (Drawings dorsal aspect, hemelytron, egg, nymph— common in "El Ahuautle ")

Size: Length from 5.15 mm. small males to 7.25 mm. large females, and head width from 1.8 mm. to 2.27 mm.

Color: General facies usually light but may be dark. Head and legs pale yellow; the mesosternum and abdominal venter of males usually black. The pronotum crossed by a variable number of slender brown lines (8 to 17) which may be furcated or incomplete. Pattern of the hemelytra formed of numerous, much furcated, anastomosing and interrupted brown transverse lines which are usually narrower than the pale interspaces. Membranal suture marked by a pale oblique stripe. Membrane with zigzag-like figures. The left membrane with the pattern interiorly effaced. Embolium may be nearly black, embrowned or pale.

Structural characteristics. The male: Head of the male inflated, the vertex roundly produced, the lateral margins of the head, beyond the caudolateral angle of the eyes, very broad and the subocular space very wide; interocular space broader than an eye. The space behind the eye broad, as broad as the length of the last antennal segment which is only 31.25 percent of the length of the third. Facial impression of the male large, not very deep and covered with fine appressed hairs. Pronotum inflated, moderately long even in brachypterous forms and transversely depressed behind the middle in brachypterous forms. The front legs as shown in Plate XXXVI, fig. 6. Femur very thick with a strong prominence at the inner side of its base. On the femur a large patch of densely inserted hairs and extending below it on to the basal prominence about 11 rows of strong stridular pegs, 3 to 6 in each row. Pala relatively narrow, broadest beyond the middle, the pegs forming a curiously-curved row, resembling the Greek letter omega on the terminal portion of the pala. The number of these pegs and their arrangement somewhat variable. The fifth abdominal tergite with a prestrigilar tuft of stiff hairs. Strigil small, longer than wide, with 3 to 4 combs. The right paramere or clasper as shown on Plate XXXVI, figure 8.

The Female: The vertex of head usually distinctly produced. (See Plate XXXVI, figure 4.) The pronotum very short in brachypterous forms but normal in macropterous forms. The metaxyphus short, blunt at the apex, with concave lateral margins, the legs showing no distinguishing features. Jaczewski gives the following measurements: Middle leg—femur : tibia : tarsus : claw :: 100 : 44.8 : 29.8 : 36.0. Hind leg—femur : tibia : tarsus 1 : tarsus 2 :: 100 : 96.1 : 107.9 : 51.3.

Location of types: The types, which for many years were presumed to be lost, were located in the Paris Museum in 1928 (see Hungerford, 1929). Here were found "six pinned specimens of *Corixa femorata* Guérin (four males and two females) (two labeled types) and four or five more in a glass vial." They were part of a display of insects and their eggs used as food (Huatlé) in Mexico.

Data on distribution: (Plate XXXVII.) While described from "Mexico" in 1857, no precise distributional records were given until Jaczewski's paper of 1931. In this he gives the following: "Tizapan, Jal., 11 VIII 1929, 17 males brach., 1 male macr., 9 females brach.; México, D. F., 8 VIII 1926, leg. S. Tenenbaum and Dr. T. Wolski, 2 males brach.; México, D. F., Chapultepec, 2 VIII 1929, 4 males brach., 4 females brach.; Tlalpam, D. F., 25 VIII 1929, 1 male macr., 2 males brach.; 2 upgrown larvae; Pátzcuaro, Mich., 28 VIII 1929, 2 males macr. sinistral, 1 male brach. normal (dextral), 1 female macr., 1 female brach.; Pátzcuaro, Mich., 31 VIII 1929, 1 male macr.; Texcoco, Mex., 4 VIII 1929, in canal, 1 female brach.; Texcoco, Mex., 4 VIII 1929, the lake, 1 male macr. sinistral, 2 males brach. normal, 7 females brach." Ancona, in his "El Ahuautle de Texcoco," gives the biology, ecology and the part this species plays in this curious food product. We have before us insects with the following records:

MEXICO: *Chiapas:* San Vicente, Jan. 4, 1938, 540 m. Utrilla L. female (macr.).

Michoacán: Carapa, Sept. 2, 1938, H. D. Thomas, 13 males (3 sinistral) 24 females (*all* macr.); Carapa, Sept. 8, 1938, H. D. Thomas, 7 males (2 sinistral) 4 females (*all* macr.); Pátzcuaro, Sept. 2, 1938, H. D. Thomas, 5 males, 13 females (all dextral, all macr. except 1 female brach.); Pátzcuaro, Aug. 31, 1938, H. D. Thomas, 1 male (dextral, brach.) 5 females (macr.); Morelia, Sept. 4, 1938, H. D. Thomas, 8 males (3 sinistral) 37 females (all macr. except 1 female); Zamora, Sept. 8, 1938, H. D. Thomas, 5 females (4 brach.); 10 miles down Chinapa road, Sept. 5, 1938, H. D. Thomas, 2 females (macr.); Zacapú, Sept. 1, 1938, H. D. Thomas, 5 females (macr.), L. J. Lipovsky, 1 female (macr.).

Jalisco: Tecolotlan, Sept. 15, 1938, H. D. Thomas, 1 male (sinistral) 3 females (macr.); Chapala, Sept. 11, 1938, H. D. Thomas, 2 males (dextral) 6 females (all macr.).

Chihuahua: Chihuahua, July 15, 1938, H. D. Thomas, 1 female (macr.).

Zacatecas: Los Potosí, Aug. 8, 1944, Henry Thomas, 5 males (2 sinistral) 11 females.

Aguascalientes: 5 miles S. E. Rincon, July 16, 1934, Smith and Dunkle, 16 males (5 sinistral) 25 females (all more or less brach.); Aug. 9, 1944, Henry Thomas, 3 males (1 sinistral) 4 females.

San Luis Potosí: 20 miles west of San Luis Potosí, Aug. 8, 1944, Henry Thomas, 50 males (27 sinistral) 53 females; Aug. 4, 1944, dirty pond, Henry Thomas, 1 male (dextral) 4 females; Aug. 5, 1944, Henry Thomas, 2 males (1 sinistral) 2 females; 10 miles east of San Luis Potosí, Aug. 7, 1944, Henry Thomas, 2 females.

Tamaulipas: San José, April 1910, 1 female.

Hidalgo: Real del Monte, Sept. 23, 1938, No. 29, H. D. Thomas, 25 males (7 sinistral) 9 females (only 3 fully macr.); Real del Monte, Sept. 23, 1938, L. J. Lipovsky, 2 males (1 sinistral) 7 females (all brach.); Agua Fría (near Jacala), July 28, 1937, H. D. Thomas, 13 males (5 sinistral) 117 females (79 brach.), 8 of males have wings two-thirds developed, other 5 macropterous; Actópan, Sept. 23, 1938, No. 32, H. D. Thomas, 34 males (11 sinistral, 14 macr.) 164 females (8 macr.).

Puebla: Puebla, July 24, 1937, H. D. Thomas, 7 males (4 sinistral) 4 females; Puebla, July 25, 1937, H. D. Thomas, 1 male (dextral) 2 females.

Distrito Federal: 150 klm. n. Mex. City, July 27, 1937, H. D. Thomas, 1 male (sinistral); Tlalpam, Nov. 3, 1936, H. D. Thomas, 10 males (2 sinistral) 7 females (all brach.); Lake Texcoco, July 26, 1937, H. D. Thomas, 38 males (1 sinistral, 20 brach.), 80 females (70 brach.); México, Apr. 22, 25, 1910, 11 males (1 sinistral) 15 females; Peñón, Oct. 27, 1898 (Ball Coll. in U. S. N. M.), 1 male (dextral) 7 females; Guadalupe, Aug. 31, 1903, W. L. Tower, 2 females; Texcoco Sea, Jan. 31, 1926, A. Dampf, 1 male (dextral).

México: West of Jalapa 15 klm., July 18, 1937, H. D. Thomas, 3 males (2 sinistral); Lake Texcoco, Palmer, 3 males (dextral) 1 female (Mus. Comp. Zool., Cambridge, Mass.).

Krizousacorixa femorata (Guér.) occurs possibly in Chiapas and certainly in the states of Michoacán, Jalisco, Chihuahua, Aguascalientes, San Luis Potosí, Tamaulipas, Hidalgo, Puebla, México, and Distrito Federal.

Krizousacorixa azteca Jaczewski

(Plate XXXVI, figs. 1, 3, 5, 7, and 9)

1931. *Krizousacorixa azteca* Jaczewski, T. Annales Musei Zoologici Polonici, Tom IX, Nr. 15, p. 211, Plate XXVIII, Figs 40-42; Plate XXIX, Fig 65

1933. *Krizousacorixa azteca*, Ancona, H. L Anales del Instituto de Biologia (Mexico), T. IV, N 1, p. 64, figs 9, 12, 13, 17A. (Drawings—dorsal aspect, hemelytra, egg, nymph—a common part of "El Ahuautle.")

1935 *Krizousacorixa azteca*, Poisson, R. Archives de Zool. Exp et Gén, LXXVII, p 471, fig XV A.

Size: Length from 5.67 mm. to 6.5 mm. Head width 1.89 mm.

Color: General facies dark but pattern indistinguishable from dark specimens of *K. femorata.*

Structural characteristics: Male: Head of male less inflated than in *K. femorata* and vertex less produced. (Compare figs. 2 and 3 on Plate XXXVI.) The lateral margin of the head, beyond the caudolateral angle of the eyes, broad. The space behind the eyes not as broad as the length of the last antennal segment which is 39.1 percent of the length of the third. Interocular space broader than an eye. Facial impression large, usually shallow, and covered with fine, appressed hairs. The pronotum well developed. The front legs as shown in figure 5, Plate XXXVI. Two rows of palar pegs, the outer row of about 20 pegs, the inner row of from 6 to 9 pegs. The fifth abdominal tergite with a prestrigilar tuft. Strigil a little shorter than in *K. femorata,* with 4 combs. Right paramere or clasper more distinctly claw-like at apex.

The female: Very difficult to distinguish from *K. femorata.* The vertex of head more broadly rounded (see figure 1, Plate XXXVI). Since the species is known only from macropterous forms, the pronotum is well developed. The metaxyphus is like that of *K. femorata.* Jaczewski gives the following measurements for the legs—Middle leg—femur : tibia : tarsus : claw :: 100 : 44.9 : 32.2 : 36.2. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 97.3 : 117.6 : 54.1.

PLATE XXXVI

Krizousacorixa Hungerford

FIG. 1. *Krizousacorixa azteca* Jaczewski; head and pronotal disk of female. Macropterous form with well developed pronotal disk.

FIG. 2. *Krizousacorixa femorata* (Guérin); head of male. Note the acutely produced inner angle of the eye which is a generic character.

FIG. 3. *Krizousacorixa azteca* Jaczewski; head of male Vertex less produced than in *K. femorata* (Guérin).

FIG. 4. *Krizousacorixa femorata* (Guérin); head and pronotal disk of female. Brachypterous form showing the reduced pronotal disk

FIG. 5. *Krizousacorixa azteca* Jaczewski; front leg of male

FIG. 6. *Krizousacorixa femorata* (Guérin); front leg of male.

FIG. 7. *Krizousacorixa azteca* Jaczewski; genital capsule of male

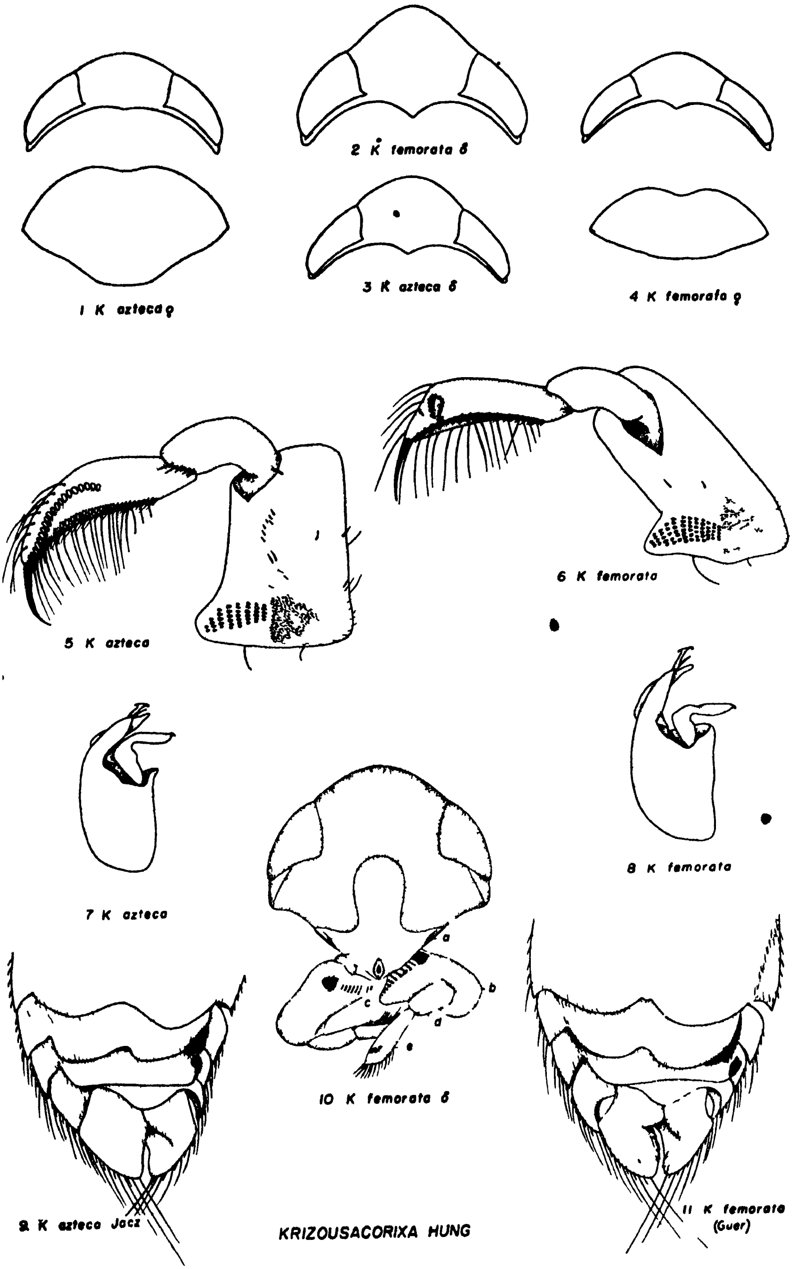
FIG. 8. *Krizousacorixa femorata* (Guérin); genital capsule of male

FIG. 9. *Krizousacorixa azteca* Jaczewski; abdomen of male, dorsal view

FIG 10. *Krizousacorixa femorata* (Guérin); head and front legs of male showing the long hypo-ocular suture extending obliquely from the lower margin of the eye and (*a*) the sclerotized margin of the head against which the peg field of the femur (*c*) rubs in stridulating; (*d*) the tibia; (*e*) the pala.

FIG. 11. *Krizousacorixa femorata* (Guérin); abdomen of the male, dorsal view.

PLATE XXXVI



1 K azteca ♀

2 K femorata ♂

3 K azteca ♂

4 K femorata ♀

5 K azteca

6 K femorata

7 K azteca

8 K femorata

9 K azteca Jacz

10 K femorata ♂

11 K femorata (Guer)

KRIZOUSACORIXA HUNG

Comparative notes: Males easily distinguished from *K. femorata* (Guér.) by the pala. The females usually distinguishable by their less acute vertex but not always because the character is variable. According to Jaczewski's figures, the intermediate and hind tarsi are relatively longer than in *K. femorata* (Guér.) and the last antennal segment relatively longer, but we have not found these measurements absolutely dependable.

Location of types: The types were all placed in the Polish Museum at Warsaw.

Data on distribution: (Plate XXXVII.) Jaczewski, who described this species, chose a male from Tizapan, Jalisco, as the holotype and reported it from the following places: Tizapán, Jal., 11 VIII 1929, 2 males, 12 females; Chapala, Jal., 16 VIII, 1929, 1 female; México, D. F., Chapultepec, 2 VIII 1929, 2 females; Tlalpam, D. F., 25 VII 1929, 1 female; Texcoco, Mex., 4 VIII 1929, a pool, 5 females; Texcoco, Mex., 4 VIII 1929, the lake, 2 females; Texcoco, Mex., 4 VIII 1929, in canals, 2 females; Pátzcuaro, Mich., islet Janicho, 28 VIII 1929, 1 female; Pátzcuaro, Mich., 28, VIII 1929, 3 females.

From the above it is evident that he had but two males, both from Tizapán, and that the other records were based upon females which are difficult to place with certainty. Nevertheless, his determinations have been verified, for Ancona took males in Lake Texcoco and Thomas collected them from Morelia, Carapa, and Pátzcuaro, Michoacán. We have before us the Thomas material, labeled as follows:

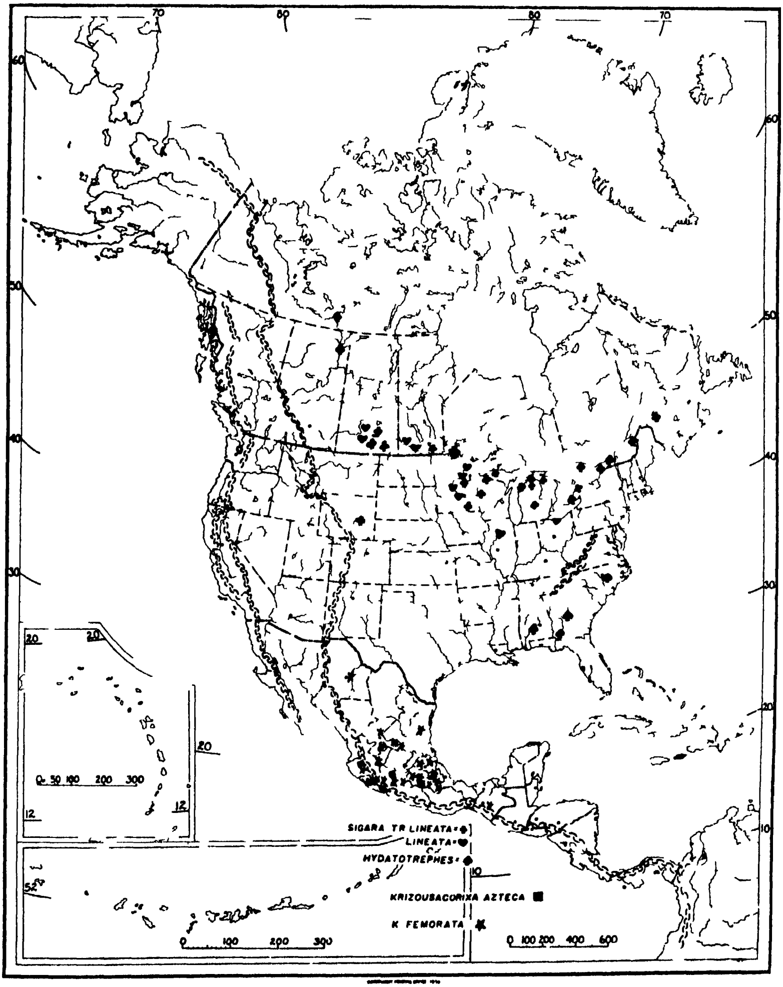
MEXICO: *Michoacán:* Morelia, Sept. 4, 1938, H. D. Thomas, 1 male, 3 females; Morelia, Sept. 3, 1938, H. D. Thomas, 1 male; Carapa, Sept. 8, 1938, H. D. Thomas, 1 male, 3 females; Pátzcuaro, Aug. 31, 1938, H. D. Thomas, 2 males, 1 female.

Zacatecas: Los Potosí, Aug. 8, 1944, H. D. Thomas, 3 females.

District Federal: Lake Texcoco, July 26, 1937, H. D. Thomas, 1 female.

The species therefore occurs in Michoacán, Jalisco, Zacatecas, México, and the Federal District of Mexico.

PLATE XXXVII



Trichocorixella Jaczewski

1981. Jaczewski, T. Annales Musei Zoologici Polonici, Tom IX, No. 15, p. 217 (with *T. wolskii* Jaczewski as genotype).

1985. Poisson, R Archives de Zool. Exp. et Gén LXXVII, p. 458.

1942 Hungerford, H B Jl. Kansas Ent. Soc., XV, No. 2, p. 62 [reports *T. wolskii* Jaczewski as syn. of *T. mexicana* (Hungerford)].

1948. Walton, G. A. Trans. Soc. for British Entomology, VIII, p. 157, (as subgenus of *Trichocorixa* Kirk).

Doctor Jaczewski gave the following description of his new genus: "Abdominal asymmetry in the males sinistral, genital armature directed leftwards. Strigil present. Front tibiae and palae of males as in *Trichocorixa* Kirk., but the palae with two rows of stridulatory pegs, one of these rows forming the central portion of a row of unmodified bristles. Pattern of the hemelytra of the *Trichocorixa*-type, membranal suture not marked by a pale oblique stripe, pale markings of corium being continued over the membrane without any interruption.

"Generic type: *Trichocorixella wolskii* n. sp.

"*Trichocorixella* gen. n. differs from *Trichocorixa* Kirk., with which it seems to be most closely related, in first line by the disposition of the stridulatory pegs on the palae of the males."

In 1942 it was discovered that *Trichocorixella wolskii* Jaczewski and *Palmacorixa mexicana* Hungerford are one and the same thing. An examination of 60 males disclosed that 24 were sinistral and 36 dextral and that both right and left asymmetry were represented in all six lots available for study. This makes necessary a redescription of the genus, for the genus is really unrelated to *Trichocorixa* as indicated by the normal position of the nodal furrow in the females.

General facies as in *Palmacorixa*. Elongate, slender species of small size. Vertex bluntly produced in both sexes. Synthlipsis broader than in *Palmacorixa* (as wide as an eye), with the inner angle of the eye right to acutely angled instead of rounded as in *Palmacorixa*. Antenna densely pilose and the fourth segment relatively longer than in *Palmacorixa*. Postocular space broad. Rear margin of the head strongly curved and embracing a very short pronotum. Pronotal disk moderately angulate laterally. Lateral lobe of prothorax linguilate. Surface of pronotum and hemelytra lightly rugulose, the latter with rather numerous procumbent hairs. Hemelytra narrow, elongate, with vermiculate markings; the membrane reduced, not distinctly defined from the corium; embolium broader than in *Palmacorixa*.

Hind wings usually aborted and nonfunctional. Front femur of male with stridular area; tibia moderately long, distally produced above with a white pad below the production; pala short, with two rows of pegs. Under side of hind femur nearly half pilosely covered. Metaxyphus short, triangular. Male abdomen unstable, either sinistral or dextral, with a strigil. The fourth abdominal tergite without large hair-margined lobes; the seventh tergite without the hook characteristic of *Palmacorixa.* Last ventral abdominal segment of female plainly and broadly incised at its tip.

This genus, which is closely related to *Palmacorixa,* shows by its inner angle of the eye a character that is possessed by *Krizousacorixa.*

Genotype: *Trichocorixella wolskii* Jaczewski = *T. mexicana* (Hungerford).

Trichocorixella mexicana (Hungerford)

(Plate XXXVIII; wash drawing No. 25, Plate V)

1927. *Palmacorixa mexicana* Hungerford, H. B. Pan-Pacific Ent. IV, No. 2, p. 94

1930. *Palmacorixa mexicana,* Walley, G. Stuart. Can. Ent. LXII, pp. 99, 101, 106

1931. *Trichocorixella wolskii* Jaczewski, T. Annales Musei Zoologici Polonici, IX, No. 15, p. 218, Pl. XXVIII, figs. 47-51, Pl. XXIX, fig. 66

1942. *Trichocorixella mexicana,* Hungerford, H. B. Jl. Kans. Ent. Soc., XV, No. 2, p. 62

Size: Length 4.5 mm to 5.7 mm. Width of head across eyes 1.4 mm. to 1.6 mm.

Color: General facies light to medium dark. Vertex may be entirely pale or may have both a median longitudinal stripe and a brown dot or spot on the interocular space near the base of each eye. These spots often remind one of ocelli. The caudal margin of the head may be brown. The pronotal disk margined with brown and crossed by five or six more or less broken or split brown lines; clavus crossed by broken or furcate brown lines, the basal ones much narrower than the pale interspaces; the distal ones broken and anastomosing, as is true of the corium and membrane; embolium embrowned; face, limbs and venter pale but sometimes embrowned.

Structural characteristics: Frontal depression of male large, attaining the eyes laterally and surpassing them dorsally, front margin of vertex produced, faint median longitudinal carina ending in the caudally produced rear margin of the head. Postocular space relatively broad. The interocular space wider than an eye as seen in projection. The antennal segments: 1 : 2 : 3 : 4 :: 20 : 12 : 25 : 10 ♂; 1 : 2 : 3 : 4 :: 20 : 12 : 28 : 12 ♀. Pronotal disk short, lenticular, its length to width varying from 22 : 60 to 28 : 52 in the brachypterous forms; its surface rugulose to faintly rastrate. Lateral lobe of prothorax wide at base, narrowing gradually toward the rounded apex. Hemelytral surface nearly smooth with rather numerous procumbent hairs. Mesoepimeron broader than the lateral lobe of the prothorax, the osteole of the scent gland laterad of its tip. Metaxyphus short, triangular. The front femur of the male somewhat inflated, basally produced, with a large area of eight or more rows of stridular pegs; the tibia and pala as shown on plate XXXVIII, the number of pegs in the upper, somewhat crescent-shaped row, from 8 to 10 and 3 or 4 pegs in the lower row. The palm a little broader in both sexes than in *Palmacorixa.* The middle leg: femur : tibia : tarsus : claws :: 100 : 49.4 : 30.9 : 43.6 (ave. of 3 males and 3 females).

The middle femur of the male with a fringe of long hair along the middle of its caudal margin. (See Plate XXXVIII, figure C.) The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.2 : 113.3 : 45.4 (ave. 3 males and 3 females).

The upper side of the hind femur with a row of from 7 to 12 pegs; the under side with most of the basal half pilose. The abdominal dorsum and genital capsule of the male, and the underside of the female abdomen as shown on Plate XXXVIII.

Location of types: Palmacorixa mexicana Hungerford was described from a male and a female taken in the Xochimilco Sea, Mexico, D. F. Aug. 3, 1924, by Alf. Dampf and are in the Francis Huntington Snow Collections of the University of Kansas. *Trichocorixella wolskii* Jaczewski described from 3 males and 15 females from México, D. F., Chapultepec, Aug. 2, 1929. These were in the Polish National Museum which was partially destroyed in World War II. Doctor Jaczewski reports that all of his types were lost.

Comparative notes: The general facies of this species similar to species of *Palmacorixa* from which it differs in having the inner angle of the eyes sharply angulate. The long anterior tibia and the short triangular pala with its peg arrangement in the males similar to *Corisella* species from which it is distinguished by the eyes as described above. The genus *Krizousacorixa* also has the inner angle of the eye even more acutely angulate, but the male pala is decidedly different in the *Krizousacorixa* species and the females do not have the incised tip to the last ventral abdominal segment. Moreover, both *Corisella* and *Krizousacorixa* have a pruinose area on the corium along the claval suture which is lacking or at least very slight, in both *Palmacorixa* and *Trichocorixella.*

Data on distribution: (Plate XLII.) We have before us the following:

MEXICO: *Zacatecas:* Los Potosí, July 9, 1944, H. D. Thomas, 1 female.

Aguascalientes: July 9, 1944, H. D. Thomas, 2 males (both sinistral), 1 female.

San Luis Potosí: 20 mi. w. of San Luis Potosí, July 8, 1944, H. D. Thomas, 6 females.

Puebla: Puebla, July 24, 1937, H. D. Thomas, 3 males (1 sinistral, 2 dextral), 10 females; Tehuacán, July 18-25, 1937, H. D. Thomas, 16 males (8 sinistral, 8 dextral), 18 females.

Dist. Federal: Chapultepec, Aug. 10, 1937, H. D. Thomas, 21 males (7 sinistral, 14 dextral), 63 females; Xochimilco, June 21, 1934, H. Hinton, 11 males (4 sinistral, 7 dextral), 16 females; México, April 22-25, 1910, 2 males (1 sinistral, 1 dextral), 1 female.

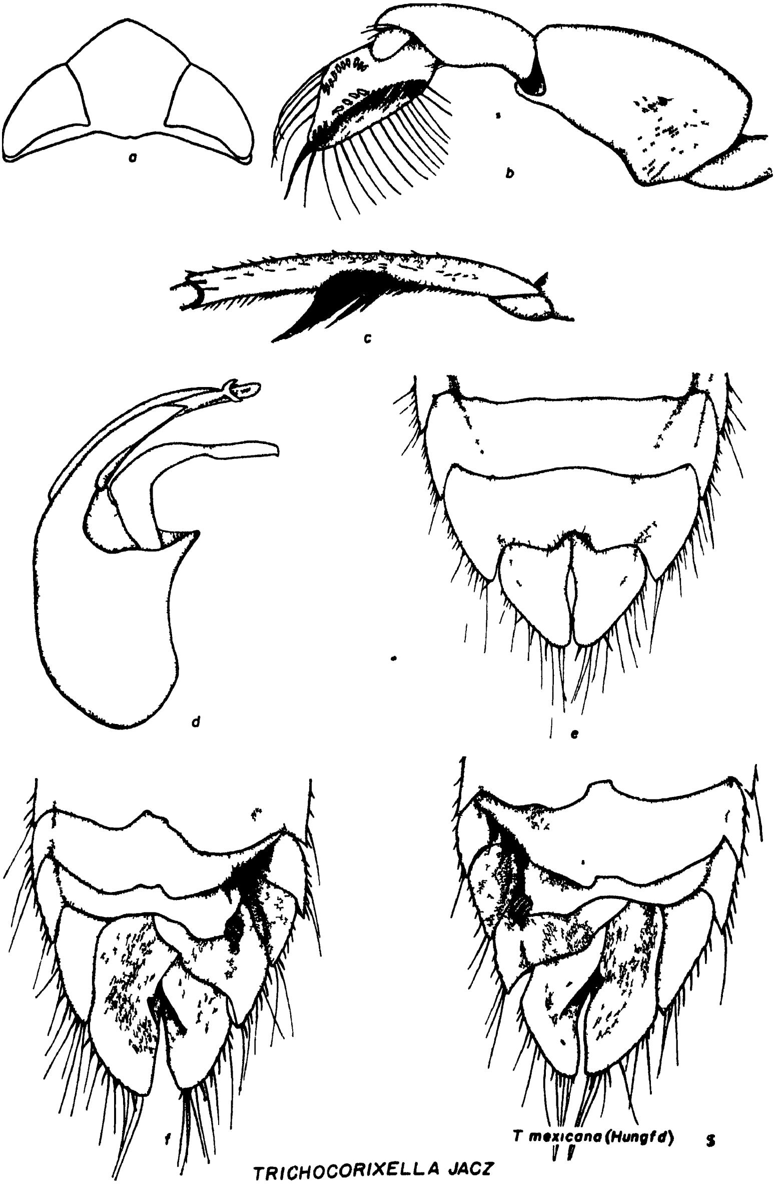
PLATE XXXVIII

Trichocorixella Jaczewski

FIG. 1. *Trichocorixella mexicana* (Hungerford) (= *wolski* Jaczewski); dorsal view of male abdomen, showing sinistral asymmetry.

FIG. 1a. Head of male.
FIG. 1b. Front leg of male.
FIG. 1c. Middle femur of male
FIG. 1d Genital capsule of male.
FIG. 1e. Ventral view of female abdomen.
FIG. 1f. Dorsal view of male abdomen, showing dextral asymmetry
FIG. 1g. Dorsal view of male abdomen, showing sinistral asymmetry.

PLATE XXXVIII



TRICHOCORIXELLA JACZ

Palmacorixa Abbott

1912. Abbott, James F. Ento. News, XXIII, pp. 337-339.
1913. Abbott, J. F. Can. Ent. XLV, p. 113.
1917. Van Duzee, E. P. Catalogue of the Hemiptera of America, p. 485.
1920. Hungerford, H. B. Univ. of Kansas Science Bull., XI, pp. 212-213.
1923. Abbott, James F., *in* Guide to the Insects of Connecticut, Pt. IV, p. 390.
1926. Blatchley, W. S. Heteroptera of Eastern North America, pp. 1082-1083, fig. 215, Pl. XII, fig. 19.
1928. Jaczewski, T. Annales Musei Zoologici Polonici VII, pp. 55, 58.
1930. Walley, G. Stuart. Can. Ent., LXII, pp. 99-106, 2 plates, 11 figures.
1935. Poisson, R Arch. de Zool. Exp. et Générale, LXXVII, p. 458.
1943. Walton, G. A. Trans. Soc. for British Entomology VIII, p. 157 (as subgenus of *Trichocorixa* Kirk.).

Elongate, slender species of small size. Vertex bluntly produced in both sexes. Synthlipsis narrow. Antennae densely pilose, third segment long and slightly curved, fourth very short, less than one-fourth the length of the third. Rear margin of the head strongly curved and embracing a very short pronotum. Pronotal disk sharply angulate laterally. Lateral lobe of prothorax ligulate, longer than broad, upper margin curved so that lobe becomes wider toward base, lower margin straight. Surface of pronotum and hemelytra rugulose. Hemelytra narrow, elongate, with vermiculate markings, tapered posteriorly, only slightly overlapping at tips, the membrane area very small, narrow, and not distinctly defined from the corium; embolium a deep, narrow trough, the pruinose area beyond the embolar suture (nodal furrow) very long. Hind wings usually aborted and nonfunctional but occasionally fully developed.* Front femur of male with stridular area; tibia short, globose, without a distal pad; pala thin, its palm narrow. Under side of hind femora nearly bare of pilosity. Metaxyphus short, subtriangular. Male abdomen dextral with a strigil; the fourth abdominal tergite with large hair-margined lobes; seventh tergite just to right of middle with a pencil of long hairs and a small, curved dextral sclerotized hook. Last ventral abdominal segment of female not plainly incised at its tip.

Genotype: *Palmacorixa gillettei* Abbott.

This strikingly distinct little genus has but one close relative which is *Trichocorixella* Jaczewski. The general facies of the species of these two genera are so similar that the genotype of *Trichocorixella* was first described as a *Palmacorixa*.

The data assembled at Ithaca, New York, by the senior author many years ago indicated that *P. buenoi* and *P. nana* wintered there in the fourth nymphal instar whereas most corixids winter as adults.

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* In fully winged forms, which are rare, the pronotum is better developed but still relatively short.

However, we have in our collections adults of *P. buenoi* Abbt. taken in South Carolina in January; in Texas, February 26; in Kansas, March 2; and in Alabama, March 13, indicating that in the southern range at least the winter can be passed as adults. Moreover, the species of this genus seem to be associated with streams or more or less permanent waters.

KEY TO PALMACORIXA ABBOTT

1. Male pala a very broad, flattened plate with a cluster of poorly defined pegs near its base as shown on Plate XXXIX, figure 1a; the pronotal disk with well marked anterolateral depressions in both sexes 2

Male pala not a broad, flattened plate; palar pegs in an arching row, often crowded into a double row of longer pegs distally 3

2 (1) Black lineations of tegmina dispersed, not massed to form heavy longitudinal blotches or stripes. .. .. *P. gillettei* Abbott (p. 243)

Black lineations of tegmina massed to form an irregular black stripe on clavus parallel to claval suture, another at base of corium extending posteriorly on corium along claval suture and dividing near apex of clavus to invade disk of corium . . ..*P gillettei confluens* Walley (p 245)

3 (1) Middle femur of male without a longitudinal row of pegs on its ventral surface *P buenoi* Abbott (p 246)

Middle femur of male with a longitudinal row of pegs on its ventral surface .. 4

4 (3) Small, usually under 5 mm long Less than 40 pegs in femoral peg row *P nana* Walley (p 249)

Larger, usually more than 5 mm. long. More than 40 pegs in femoral peg row *P nana walleyi* n subsp (p 251)

*Palmacorixa gillettei** Abbott

(Plate XXXIX, figs. 1, 1a, 1b, 1c, 1d, and 1e; wash drawing No. 24, Plate V)

1912. *Palmacorixa gillettii* Abbott, J F Ent. News XXIII, pp 337-339, Pl 18
1913. *Palmacorixa gillettei*, Abbott, J. F. Can. Ent. XLV, p 113.
1913 *Palmacorixa gillettei*, Abbott, J. F Bull. Brooklyn Ent Soc VIII, p 81, fig 1c.
1917 *Palmacorixa gillettii*, Van Duzee, E P. Catalogue of the Hemiptera of America . . . , p. 485.
1920 *Palmacorixa gillettii*, Hungerford, H B. Univ of Kansas Sci. Bull, XI, pp 214-215.
1921. *Palmacorixa gillettei*, Hussey, R F. Psyche, XXVIII, p 14. (From Galien River near Three Oaks, Mich)
1926. *Palmacorixa gillettii*, Blatchley, W. S Heteroptera of Eastern North America p 1082, fig 215j
1930. *Palmacorixa gillettii*, Walley, G Stuart Can Ent LXII, p 101, Pl XI, figs. 1, 2, 4.

Size: Length 4.6 mm. to 6 mm.; width of head 1.3 mm. to 1.5 mm.

Color: General facies light to medium. The vertex and face yellow to dark brown. The pronotum crossed by six or more, more or less broken or split brown bands. The hemelytral pattern reticulate, the brown lines narrower than the pale interspaces, sometimes partly effaced on the inner basal area of the clavus and fused into a ragged longitudinal lateral submarginal band on clavus, also often fused into a zigzag, sometimes broken, submarginal line on the corium; the pattern of membrane continuous with that of corium; embolium pale. Venter and legs pale.

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* This species was named in honor of Professor Gillette and, while spelled *P. gillettii* in the original description, it is assumed that Abbott considered this a typographical error, for in the following papers he used *P. gillettei*.

Structural characteristics: Frontal depression of the male not very deep but margined laterally by a ridge between it and a depression beneath the inner angle of the eye and dorsally is continued as two slightly diverging fossa extending nearly to the anterior margin of the vertex. Antennal segments 1 : 2 : 3 : 4:: 15 : 15 : 43 : 10 ♂ ; 1 : 2 : 3 : 4 :: 15 : 15 : 45 : 10 ♀. Pronotal disk lenticular, its length : its width :: 28 : 53; anterior portion depressed on either side of the median line which appears as a faint carina; its surface sometimes faintly rastrate. Hemelytral surface rugulose with sparce hairs. Mesoepimeron a little broader than the lateral lobe of the prothorax, the osteole of the scent gland laterad of its tip. Metaxyphus short, triangular, pointed. The front femur of the male with a large stridular field of pegs; the tibia nearly globose, the pala a large, thin plate covered with appressed, white, spinelike hairs and some stouter ones as shown on Plate XXXIX, figure 1a; the palm very narrow. The middle leg: femur : tibia : tarsus : claw :: 100 : 41.1 : 24.1 : 40.3. The male middle femur does not have a row of pegs on the ventral side. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 78.2 : 105.1 :: 38.6. The upper side of the hind femur with a long row of a dozen sharp-pointed pegs; the underside bare and shining, rarely showing any pegs but occasionally up to a dozen irregularly spaced spines. The abdominal dorsum of male as shown on Plate XXXIX, figure 1d. The male clasper as shown on Plate XXXIX, figures 1b, 1c, and 1e.

Comparative notes: Doctor Walley writes, "The males of *gillettei* are at once distinguished from all other species by the much dilated and flattened pala shown in figure 1. The lobes of the fourth abdominal tergite are a little shorter in *gillettei* than in *buenoi* and the strigil is noticeably larger in the former species. The male right clasper, while slightly variable, has a more conspicuous lobe on its inner margin just beyond the middle than in *buenoi* and *nana*. Further, the section beyond the middle is broader and less necklike than in *buenoi*. The pronotum is usually distinctly longer in proportion to its width in *buenoi*. The color pattern of *gillettei* varies somewhat as noted above, but the black reticulations of the tegmina are always more dispersed, not tending to form a close network as in *buenoi*, and they are frequently entirely absent on the inner basal angle of the clavus. This gives the whole insect a distinctly paler aspect than either *buenoi* or *nana*. The vertex is paler with the longitudinal brownish streak distinct in *gillettei*." Unfortunately, the color pattern is so variable that the species are not distinguishable by it. *P. buenoi* often has a brown streak on head and sometimes the pattern on the base of the clavus is effaced.

Location of types: According to Abbott's paper, he described this species from three males and three females, collected in May and June by Professor C. P. Gillette and given to him. Walley, in 1930, studied a male in the Bueno collection that bears the label "Ft. Collins, Col., 5, 22, '00," a red label bearing the single word "type," and a pale blue label in Abbott's handwriting, "*Palmacorixa gillettei* Abb. co-type." This specimen Walley designated the lectoholotype. We have before us from the Abbott collection five specimens with red labels, each bearing the single word "type." They are all females! Three of them are labeled "Ft. Collins, Col. 5-22-00" and two, "Ft. Collins, Col. 6-7-00."

Data on distribution: (Plate XLII.) Described from Fort Collins, Colorado, and reported from Michigan by Hussey and from Quebec province, Canada, by Walley. Besides the types we have seen the following:

Minnesota: Rochester, July 16, 1921, H. B. Hungerford, 3 males, 3 females; Bengal, Aug. 10, 1922, H. B. Hungerford, 1 male, 1 female; Pelican Rapids, Aug. 22, 1922, H. B. Hungerford, 13 males, 10 females; Carlson, Aug. 8, 1922, H. B. Hungerford, 1 male, 1 female.

Michigan: Cheboygan Co., Aug. 18, 1931, H. B. Hungerford, 1 male; Pidgeon River, July, 1938, H. B. Hungerford, 2 females; Berrien Co., Sept. 1, 1919, R. F. Hussey (Hussey); Ann Arbor, July 30, 1921, R. F. Hussey (Hussey).

Iowa: Butler Co., July 6, 1940, J. W., 1 male, 1 female.

Palmacorixa gillettei confluens Walley

(Plate XXXIX, fig. 2, after Walley)

1930 *Palmacorixa gillettii confluens* Walley, G. Stuart. Can. Ent. LXII, p 103, Pl. XI, figs 3, 5.

The following is taken from the original descriptive notes:

Size: Average about 1 mm. longer than typical *gillettei* and are slightly more robust.

Color: The ground color of the vertex, pronotum and tegmina is a rich, yellowish brown (the vertex is sometimes purplish tinged) with the black pronotal bars and tegminal blotches sharply contrasting. (See reproduction of Walley's figure on Plate XXXIX.) The front legs, face and venter are paler yellowish.

Structural characteristics: "Structurally identical with *gillettii.*" The variation shown in the right male clasper grades into that of typical *P. gillettei.*

Location of types: Holotype: male, Minaki, Ont., July 4, 1928 (J. McDunnough): No. 3125 in the Canadian National Collection, Ottawa. Allotype: female, same data as holotype. Paratypes, 9 males, 4 females, Minaki, Ont., June 30-July 4, 1928 (J. McDunnough). Paratypes in the Canadian National Collection and in the collection of Mr. J. R. de la Torre-Bueno. . . . One male in the Francis Huntington Snow Collections, University of Kansas. (See Plate XLII).

Palmacorixa buenoi Abbott

(Plate XXXIX, figs. 3 to 3d; Plate XL, fig 3; Plate XLI, figs. 1 to 14)

1913 *Palmacorixa buenoi* Abbott, J. F. Can. Ent. XLV, pp 113-116.

1913. *Palmacorixa buenoi,* Abbott, J. F Bull. Brooklyn Ent Soc, VIII, p. 87 (figs pala of ♂ and ♀)

1917. *Palmacorixa buenoi,* Van Duzee, E. P. Catalogue of Hemiptera of America . . . , p. 485

1917 *Palmacorixa buenoi,* Parshley, H. M Occ. Papers of Boston Soc Nat Hist., VII, p. 119.

1920 *Palmacorixa buenoi,* Hungerford, H. B. Univ. of Kansas Sci Bull, XI, pp 213-214, 221-228, Pl. XXVIII (life history).

1921 *Palmacorixa buenoi,* Hussey, R. F Psyche, XXVIII, p. 14.

1928. *Palmacorixa buenoi,* Abbott, J F, *in* Guide to the Insects of Connecticut, Pt. IV. p. 390, fig. 36.

1926. *Palmacorixa buenoi,* Blatchley, W. S. Heteroptera of Eastern North America, pp 1082-1083, Pl. XII, fig. 19, fig. 215i.

1928. *Palmacorixa buenoi,* Torre-Bueno, J R. de la, *in* A List of the Insects of New York, p. 142 (Cornell Univ. Agri. Exp. Sta. Memoir 101).

1930. *Palmacorixa buenoi,* Walley, G. Stuart. Can. Ent. LXII, pp. 103-106, Pl. XII, figs. 6, 9, 11.

1938. *Palmacorixa buenoi,* Brimley, C S. Insects of North Carolina, p. 85.

1939. *Palmacorixa bueoni,* Millspaugh, Dick D. Field and Lab., VII, No 2, p 85.

Size: Length 4.3 mm. to 6 mm.; width of head 1.2 mm. to 1.6 mm.

Color: General facies light to medium dark. The vertex and face usually yellow; sometimes there is a median brown line and in others, both vertex and face are dark brown. The pronotum crossed by four to nine brown lines that vary in width and may be entire, often broken or furcate. The hemelytral pattern reticulate; usually these reticulations are more numerous than in *P. gillettei;* the pattern of membrane continuous with that of corium; embolium pale. Venter and legs pale.

Structural characteristics: Frontal depression of the male shallow, elongate, obovate. A depression beneath the inner angle of the eye. Antennal segments 1 : 2 : 3 : 4 :: 18 : 12 : 42 : 8 ♂ ; 1 : 2 : 3 : 4 :: 18 : 12 : 40 : 10 ♀. Pronotal disk flattened, margined, lenticular in outline, evenly rounded posteriorly, dull, minutely rastrate and usually distinctly shorter in proportion to its width than in *P. gillettei.* Hemelytral surface rugulose with sparse hairs. Mesoepimeron a little broader than the lateral lobe of the pronotum, the osteole of the scent gland just laterad of its tip. Metaxyphus short, triangular, pointed. The front femur of the male with a stridular field of pegs; the tibia short but less globular than in *P. gillettei;* the pala thin, rather elongate, the pegs usually in a single row as shown on Plate XXXIX, figure 3a. The middle leg: femur : tibia : tarsus : claws :: 100 : 42.2 : 27.7 : 44.5. The middle femur of the male does not have a row of pegs. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 80.7 : 107.7 : 36.3. The upper side of hind femur with a long row of about a dozen sharp pointed pegs; the underside bare and shining, rarely showing any pegs. The abdominal dorsum of the male as shown on Plate XXXIX, figure 3d. The male claspers as shown on Plate XXXIX, figures 3b and 3c.

Comparative notes: The males do not have a row of pegs on the middle femur, which separates them from *P. nana* and *P. nana walleyi,* and the elongate pala readily separates them from *P. gillettei.* Usually the females may be separated from *P. gillettei* by the more numerous reticulations on the clavus, and by the pronotum which has only faint anterior depressions.

Location of types: Described from two males and two females from White Plains, N. Y., taken in August and September by J. R. de la Torre-Bueno. These four specimens, each bearing a red label with the word "type," are before us. We are designating a male labeled "White Plains, N. Y., 21, IX, '07" as the lectoholotype and a female, taken with it, as the lectoallotype. The other two specimens are then paratypes, one taken Aug. 3, '08, and the other Aug. 31, '09. Doctor Abbott also reported specimens from Washington, D. C. (coll. W. L. McAtee); Oglethorpe, Georgia (coll. T. C. Bradley); Hadley, Mass. (coll. C. A. Frost), and Valhalla, N. Y., (coll. Bueno). We have before us the following: Valhalla, N. Y., 27-V-08, 3 females; Hadley, Mass., 14-V-10, 1 male, 2 females. We also have other specimens labeled White Plains, N. Y., that were studied by Abbott and, while most of them are *P. buenoi,* there is one male that is *Palmacorixa nana* Walley, indicating that he included it within the range of variation of his *P. buenoi.*

Data on distribution: (Plate XLII.) Described from White Plains, New York, and reported from Valhalla, N. Y., Washington, D. C., Oglethorpe, Ga., and Hadley, Mass., by Abbott; from Ithaca, N. Y., by Hungerford; from Michigan by Hussey; from the Provinces of Quebec and Ontario, Canada, and from Iowa by Walley; from Texas by Millspaugh. Besides those of the type series, we have seen the following:

U. S. A.: *New York:* White Plains, Aug. 3, 1908, 4 males, 4 females (Kirk. Coll.); Cold Springs Harbor, L I., N. Y., Aug 1902, 1 female (Barber Coll.); Cranberry Lake, L. I., July 29, 1919, C. H. Foster, 2 females (Drake Coll.); White Plains, June 28, 1919, Torre-Bueno (Bueno Coll.) 1 male; Long Island, Queen's Village, Sept. 25, 1927, J. C. Lutz (Lutz); Staten Island, Aug. 16, 1903, 1 male, 1 female; Ithaca, Beebe L., June 19, 1917, H B Hungerford, 1 male, 3 females; Ithaca, July 12, 1920, 1 male, 2 females (Cornell); Alleghany St. Park, 1 female (U. S. N. M.).

New Jersey: Lakehurst, May 23, 1903, 1 male; New Jersey, 1 male, 1 female (Uhler Coll.); Rancoca, Aug 30, 1927, E. M. Becton, 4 males, 3 females; Westville, June 5, 1898, 1 female (Parshley).

Massachusetts: Northampton, Oct. 14, 1918, H M. Parshley, 2 males, 5 females; Hadley, May 14, 1910, 1 male, 2 females.

Pennsylvania: Philadelphia, July 1914, Carl Ilg, 1 male, 1 female; Bristol, Sept. 4, 1937, J. C. Lutz, 2 males; Erie, Presque Isle, Horseshoe Pond, July 1940, Mrs. T. Lewis (Carnegie) 3 males, 2 females.

Virginia: Vienna, Sept. 19, 1931, P. W. Oman, 2 males; Vienna, April 30, 1932, P. W. Oman, 6 males, 4 females (U. S. N. M.); Norfolk, April 9, 1932, L. D. Anderson, 3 males, 3 females; Norfolk, May 11, 1938, G E Gould, 3 males, 3 females.

West Virginia: W. Hartford, Dec. 24, 1931, J. K. Moore (U S. N M.) 1 male.

South Carolina: Clemson College, Jan. 24, 1930, D. Dunavan, 1 male, 1 female (S. C. Exp. Sta.); Grantsville, Oct. 25, 1930, D. Dunavan (S. C. Exp. Sta.) 1 male, 1 female.

Georgia: Tipton, July 28, 1930, R H. Beamer, 9 males, 5 females.

Florida: St. Petersburg, Sept. 13, 1937, E. M. Becton, 1 male; La Belle, July 16, 1939, J. D. Beamer, 1 female.

Alabama: Marvin Lake, Mar. 13, 1939, R J. Christenson, 3 males, 5 females; Coatopa, July 18, 1930, P. W. Oman, 2 males, 1 female; Tuskegee, July 22, 1930, P. W. Oman, 1 male; Montgomery, July 7, 1939, J. D. Beamer, 1 female.

Louisiana: Madison Parish, July 7, 1930, R. W. Bunn, 1 male.

Texas: Colorado Co., May 11, 1922, G. O. Wiley, 9 males, 7 females; Menard Co., July 19, 1938, R. H. Beamer, 1 male; Beasley, Nov. 7, 1932, L. D. Tuthill, 1 male; Wood Co., Feb. 26, 1939, D. C. Millspaugh, 1 male.

Kansas: Decatur Co., July 6, 1926, R. H. Beamer, 8 males, 18 females; Douglas Co., July 9, 1920, W. E. Hoffmann, 1 male; Douglas Co., Oct. 8, 1923, H. B. Hungerford, 3 males, 1 female; Doniphan Co., March 2, 1924, Jean Linsdale, 1 male, 4 females.

Iowa: Washington Co., June 11, 1940, 2 males.

South Dakota: Volga, June 19, 1921, 1 female; Dixon, 1 mi. N W, May 26, 1940, G. B. Spawn (Severin Coll.)

Minnesota: Big Stone Co., July 19, 1910, 1 female; St. Paul, Phalen Lake, June 19, 1921, H. B. Hungerford, 7 males, 13 females; Carlson, Aug. 8, 1922, H. B. Hungerford, 3 males, 1 female.

Indiana: Mineral Springs, July 4, 1913, A. B. Wolcott, 1 male (Field Mus. Coll.).

Michigan: Cheboygan Co., July 27, 1933, H. B. Hungerford, 1 male, 2 females; Cheboygan Co., 1935, M. W. Sanderson, 2 males; Burt Lake, June 26, 1929, H. B Hungerford, 1 male, 1 female; Huron Co., Pigeon Lake, June 29, 1922, R. F Hussey, 2 males, 2 females (Mich. Coll)

Palmacorixa nana Walley

(Plate XL, figs 1 to 1d; Plate XLI, figs. 17, 18, 21-31)

1930. *Palmacorixa nana* Walley, G. Stuart. Can Ent. LXII, p. 106, Pl XII, figs 7, 8 and 10

1932 *Palmacorixa nana,* Ricker, Wm. E. Pub of Ontario Fisheries Research Lab No 44 *in* Univ. Toronto Press Biol. Ser No. 36, p. 88. (In stomach of speckled trout.)

Size: Length 4 mm. to 5 mm.; width across head 1.27 mm. to 1.3 mm.

Color: "Ground color yellowish brown, head suffused with brownish, the median brown line on vertex only faintly visible. Venter of thorax and front legs paler yellowish; mid and hind legs and abdominal venter yellowish brown. Pronotum with about seven slightly interrupted transverse black bars which are slightly narrower than the paler interspaces. Tegmina with an interlocking pattern of blackish flecks somewhat similar to *gillettii* but the flecks larger and coarser, giving a darker aspect to tegmina. Embolium dirty yellowish with extreme margin brownish. Apex of tegmina brownish tinged." (From Walley, 1930.)

Structural characteristics: "Vertex from above produced as in *buenoi.* Front with median oval depression small, slightly exceeding lower margin of eyes but distinctly narrower than greatest interocular width. Carina of vertex weak, obsolete anteriorly. Disk of pronotum twice as broad as median length, without median carina, surface finely roughened but not rastrate and without impressed lines, posterior margin bluntly angulate at middle. Lateral lobe of prothorax and metaxyphus as described for the genus. Front femora twice as long as broad, quadrangular with the rastrate area smaller than in *buenoi.* Front tibia with a row of four minute pegs near inner margin.* Pala shorter and stouter than in *buenoi* with more slender pegs in a single irregular row. Metathoracic wings vestigial. Tegmina dullish, finely roughened but not rastrate. Strigil formed as in *gillettii,* larger than in *buenoi,* 4-5 striae." Right clasper of male shown on Plate XL, figure 1b. In addition to the above we give the following: Antennal segments 1 : 2 : 3 : 4 :: 12 : 12 : 35 : 8 ♂ ; 1 : 2 : 3 : 4 :: 15 : 15 : 38 : 5 ♀ . Middle leg: femur : tibia : tarsus : claws :: 100 : 42 : 27.1 : 43.8. The middle femur of the male with a longitudinal row of from 20 to 35 pegs on its lower surface. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 77.8 : 104.6 : 36.7. The upper side of hind femur with an inconspicuous row of eight or more pegs; the underside bare and shining, rarely showing any pegs. The abdominal dorsum of the male as shown on Plate XL, figure 1d. The male claspers as shown on Plate XL, figures 1b and 1c. Additional drawings showing variations on Plate XLI.

Comparative notes: This species is smaller than *P. buenoi* Abbott and the row of pegs on the middle femur distinguishes it from that species. Hungerford's notes, 1920, on *P. buenoi* from Bool's Backwater, Ithaca, N. Y., apply to this species.

Location of types: Holotype male, Kazubazua, Que., July 21, 1927, G. S. Walley; No. 3126 in the Canadian National Collections, Ottawa. Male right front leg and genitalia on slide. Allotype female, same data as holotype. Paratypes 1 male, 2 females, Kazubazua, Que., July 22, 1927, G. S. Walley. The male paratype was kindly loaned to us for study.

Data on distribution: (Plate XLII.) We have before us the following:

CANADA: *Quebec:* Wakefield, May, 1930, G. S. Walley, 1 male, 1 female.

U. S. A.: *New York:* White Plains, Aug. 25, 1907, 1 male; Ithaca, Bool's Backwater, June 8, 1917, H. B. Hungerford, 2 males, 4 females; Ithaca, N. Y., July 9, 1920, 1 male (Cornell Coll.).

North Carolina: Boardman, Sept. 21, 1915, R. W. Leiby, 2 males, 3 females.

Michigan: Pigeon River, July, 1938, H. B. Hungerford, 4 males, 4 females; Ann Arbor, July 5, 1921, R. F. Hussey, 2 males, 1 female (Mich. Coll.).

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* These are shown in Walley's drawing but we have not been able to find them on a paratype loaned for study nor upon any specimens we have examined.

Minnesota: Rochester, July 16, 1921, H. B. Hungerford, 19 males, 24 females; Hennepin Co., Minnehaha Creek, July 9, 1921, H. B. Hungerford, 1 male.

Palmacorixa nana walleyi n. subsp.

(Plate XL, figs. 2 to 2d; Plate XLI, figs 15, 16, 19, and 20)

A series of specimens that are considerably larger, lighter in color and with a longer row of pegs on the middle femur of the male are here designated as a subspecies of *Palmacorixa nana* Walley.

Size: Length 4.8 mm. to 5.5 mm.; width of head 1.4 mm. to 1.5 mm.

Color: General facies light to medium. The vertex and face usually yellow with a median brown line on vertex. Pronotal disk and hemelytral pattern as in *P. buenoi.* The brown markings on the base of the clavus sometimes partially effaced.

Structural characteristics: Frontal depression of the male shallow, obovate. A depression beneath the inner angle of the eye as in all the species of the genus. Antennal segments: 1 : 2 : 3 : 4 :: 15 : 15 : 40 : 5 ♂ ; 1 : 2 : 3 : 4 :: 15 : 15 : 42 : 5 ♀ . Pronotal disk minutely rastrate. Hemelytra surface rugulose with sparse hairs. Mesoepimeron no broader than the lateral lobe of the pronotum; the osteole of the scent gland just laterad of its tip. Metaxyphus short, the lateral margins concavely curved. The front leg of the male as shown on Plate XL, figure 2a. The middle leg: femur : tibia : tarsus : claws :: 100 : 40.7 : 25.5 : 39.2; the femur of the male with a row of 40 or more pegs. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 73 : 104.3 : 39.4. The upper side of the hind femur with a long row of about a dozen sharp pointed pegs; the underside bare and shining, rarely showing any pegs. The abdominal dorsum of the male as shown on Plate XL, figure 2d. The male claspers as shown on Plate XL, figures 2b and 2c. Additional drawings on Plate XLI.

Location of types: Holotype, allotype and 22 paratypes (11 males, 11 females) from Douglas Co., Kansas, Oct. 24, 1921, Robert Guntert. In the Francis Huntington Snow Collections, University of Kansas.

Comparative notes: This differs from the typical *P. nana* Walley in its larger size and in having a longer row of pegs on the middle femur of the male (see drawings on Plate XL). The left clasper of the male is narrower at its tip.

Data on distribution: (Plate XLII.) Douglas Co., Oct. 24, 1921, Robert Guntert, 12 males, 10 females; Dykeman's Crossing, Wakarusa R., nr. Lawrence, April 30, 1938, E. Humphrey, 70 males, 110 females.

Texas: Sequin, June 26, 1938, R. I. Sailer, 21 males, 20 females.

New Mexico: Eddy Co., July 9, 1927, P. A. Readio, 2 males, 3 females.

PLATE XXXIX

Palmacorixa Abbott

FIG. 1. *Palmacorixa gillettei* Abbott; dorsal view of male (after Walley).*

FIG. 1a. Pala of male

FIG. 1b. Right clasper of male genital capsule.

FIG. 1c. Left clasper.

FIG. 1d. Dorsal view of male abdomen.

FIG. 1e. Right clasper, enlarged (after Walley).*

FIG. 2. *Palmacorixa gillettei confluens* Walley; dorsal view of male (after Walley).*

FIG. 3. *Palmacorixa buenoi* Abbott; dorsal view of male (after Walley).*

FIG. 3a. Front leg of male.

FIG. 3b. Right clasper of male from Colorado Co , Texas.

FIG. 3c. Left clasper, Colorado Co., Texas

FIG. 3d. Dorsal view of male abdomen.

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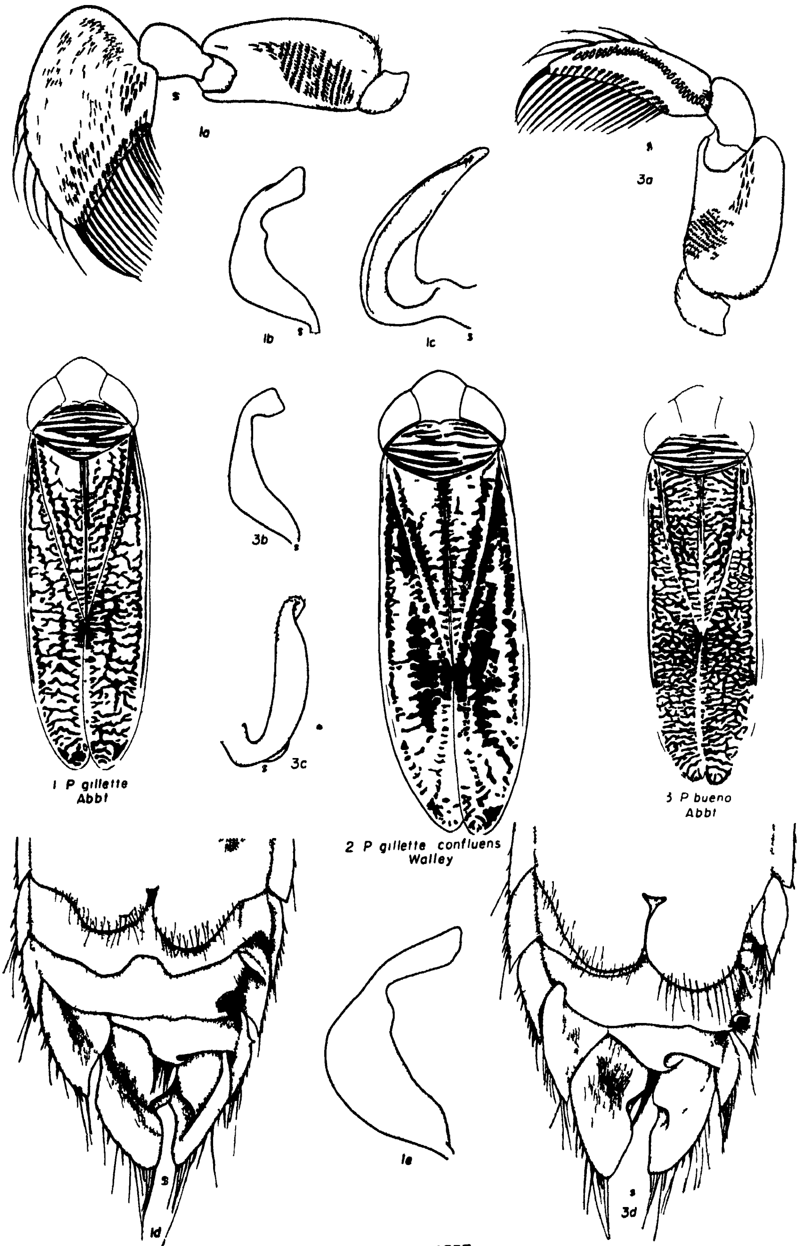
* Doctor Walley kindly sent me his original drawings for use in this paper.

PLATE XXXIX



1 P gillette Abbt

2 P gillette confluens Walley

3 P bueno Abbt

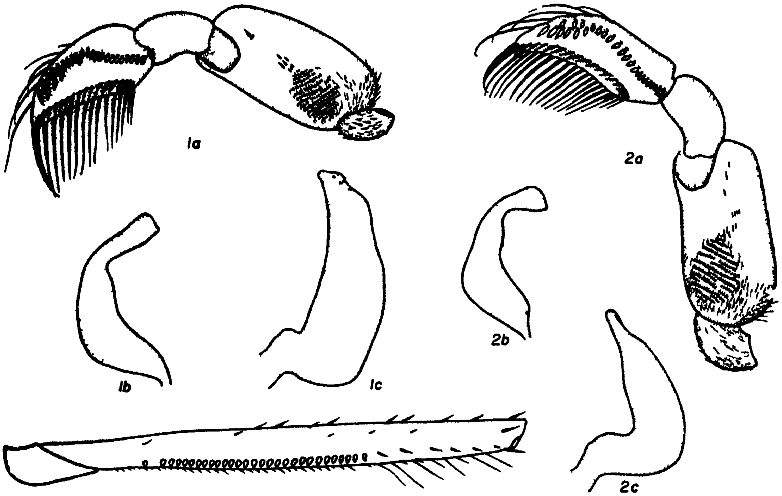
PALMACORIXA ABBT

PLATE XL

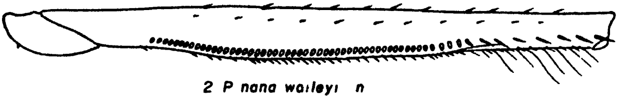
Palmacorixa Abbott

FIG. 1. *Palmacorixa nana* Walley; middle femur of male.
FIG. 1a. Front leg of male.
FIG. 1b. Right clasper of male (Quebec).
FIG. 1c. Left clasper (Quebec).
FIG. 1d. Dorsal view of male abdomen.
FIG. 2. *Palmacorixa nana walleyi* n. subsp.; middle femur of male
FIG. 2a. Front leg of male.
FIG. 2b. Right clasper (Douglas Co., Kansas).
FIG. 2c. Left clasper (Douglas Co , Kansas).
FIG. 2d. Dorsal view of male abdomen.
FIG. 3. *Palmacorixa buenoi* Abbott; middle femur of male.

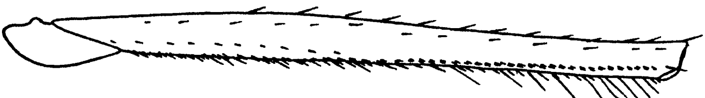
PLATE XL



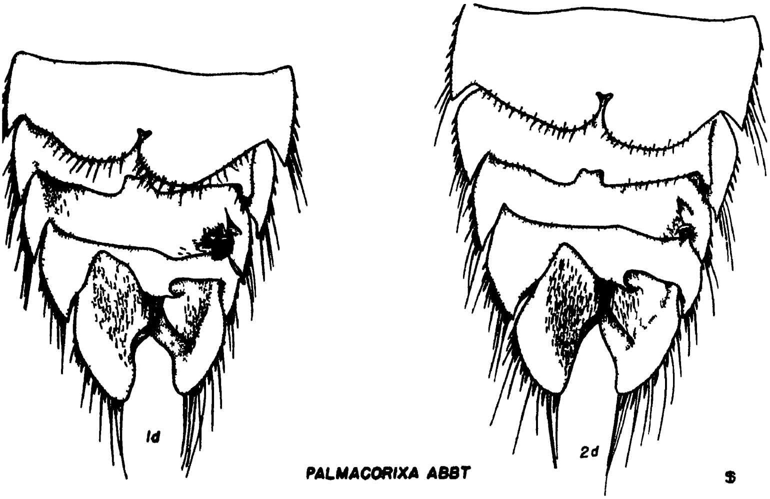
1 P nana Walley



2 P nana walleyi n



3 P buenoi Abbt



PALMACORIXA ABBT

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PLATE XLI

Palmacorixa Abbott

FIG. 1. *Palmacorixa buenoi* Abbott; right clasper, Red Deer River, Manitoba.

FIG. 2. *P. buenoi* Abbott; right clasper, Cheboygan Co., Mich.

FIG. 3. *P. buenoi* Abbott; right clasper, Philadelphia, Pa.

FIG. 4. *P. buenoi* Abbott; right clasper, Decatur Co., Kan.

FIG. 5. *P. buenoi* Abbott; right clasper, Colorado Co., Tex.

FIG. 6. *P. buenoi* Abbott; right clasper, Marvin Lake, Ala.

FIG. 7. *P. buenoi* Abbott; right clasper, Douglas Co , Kan

FIG. 8. *P. buenoi* Abbott; right clasper, Norfolk, Va.

FIG. 9. *P. buenoi* Abbott; left clasper, Norfolk, Va.

FIG. 10. *P. buenoi* Abbott; right clasper, Norfolk, Va.

FIG. 11. *P. buenoi* Abbott; left clasper, Tipton, Ga.

FIG. 12. *P. buenoi* Abbott; right clasper, Tipton, Ga.

FIG. 13. *P. buenoi* Abbott; left clasper, Rancoca, N. J.

FIG. 14. *P. buenoi* Abbott; right clasper, Rancoca, N. J.

FIG. 15. *Palmacorixa nana walleyi* n. subsp.; left clasper, Scott Co., Kan.

FIG. 16. *Palmacorixa nana walleyi* n. subsp ; right clasper, Scott Co., Kan

FIG. 17 *Palmacorixa nana* Walley; left clasper, Sequin, Tex.

FIG. 18. *Palmacorixa nana* Walley; right clasper, Sequin, Tex.

FIG. 19. *Palmacorixa nana walleyi* n. subsp ; left clasper, N. C.

FIG. 20. *Palmacorixa nana walleyi* n subsp.; right clasper, N. C.

FIG. 21. *Palmacorixa nana* Walley; left clasper, Pigeon River, Mich.

FIG. 22. *Palmacorixa nana* Walley; right clasper, Pigeon River, Mich.

FIG. 23. *Palmacorixa nana* Walley; left clasper, Ithaca, N. Y.

FIG. 24. *Palmacorixa nana* Walley; right clasper, Ithaca, N. Y.

FIG. 25. *Palmacorixa nana* Walley; male pala, Ithaca, N. Y.

FIG. 26. *Palmacorixa nana* Walley; pala of male, Ithaca, N. Y.

FIG. 27. *Palmacorixa nana* Walley; left clasper, Rochester, Minn.

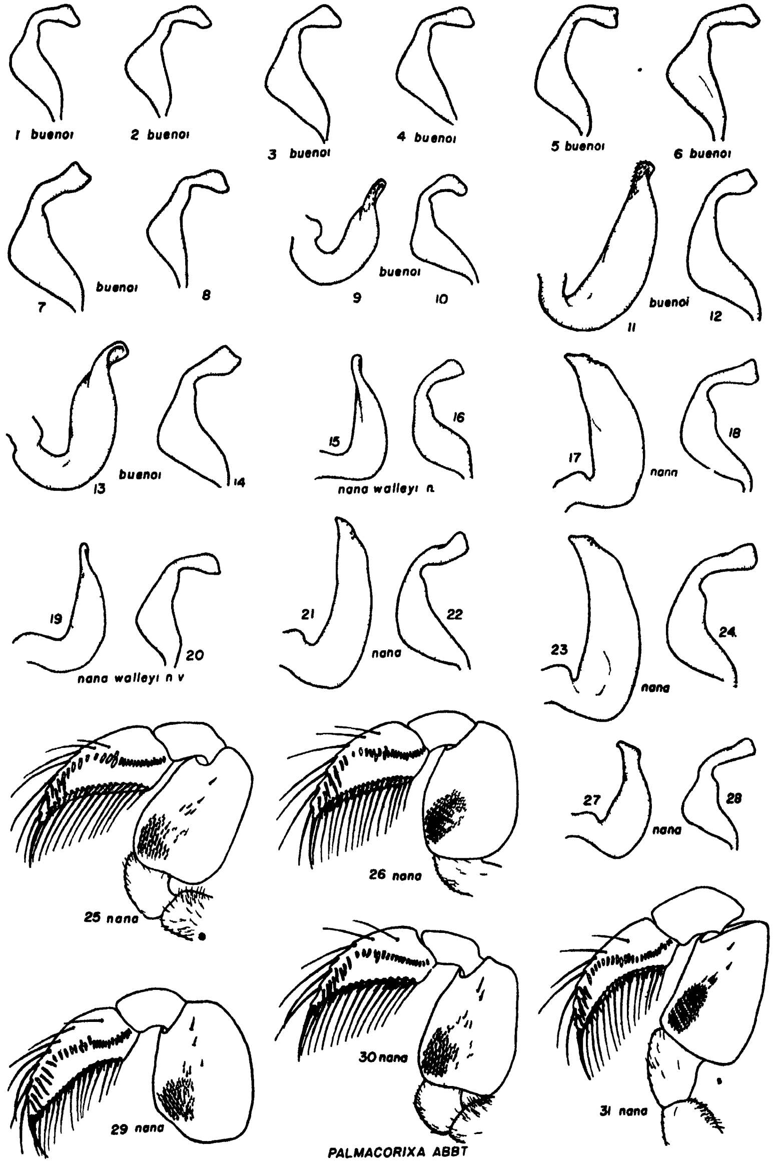
FIG. 28. *Palmacorixa nana* Walley; right clasper, Rochester, Minn.

FIG. 29. *Palmacorixa nana* Walley; pala of male, Bool's Backwater, N. Y.

FIG. 30. *Palmacorixa nana* Walley; pala of male, Bool's Backwater. N. Y.

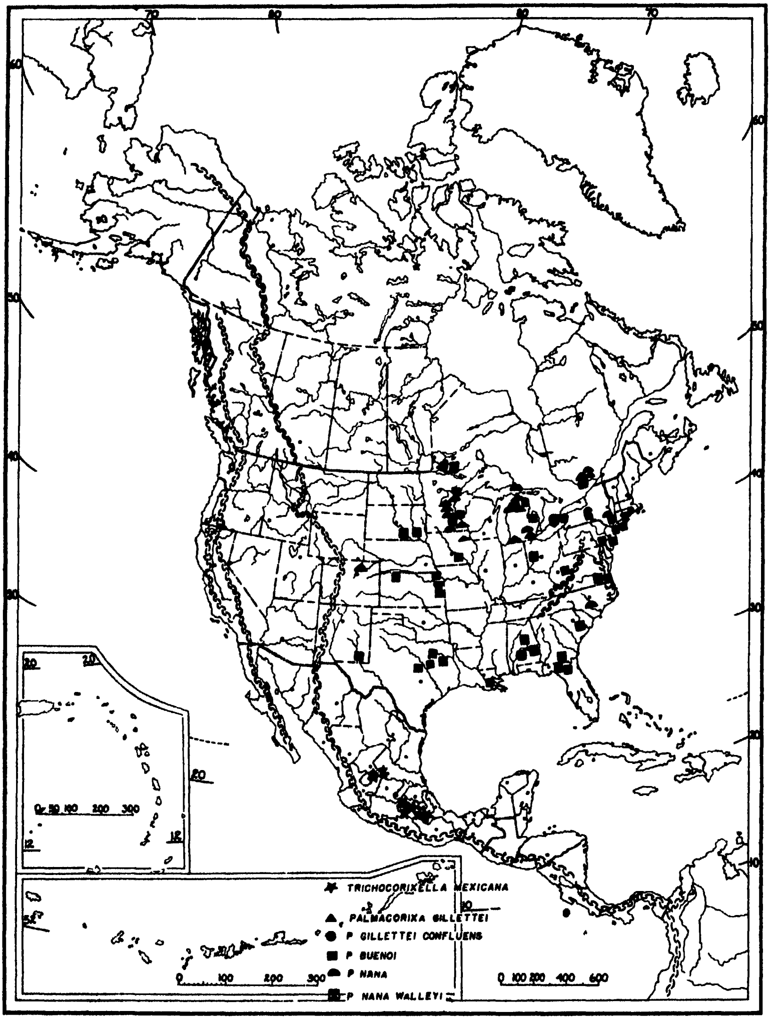
FIG. 31. *Palmacorixa nana* Walley; pala of male, Bool's Backwater, N. Y.

PLATE XLI



PALMACORIXA ABBT

PLATE XLII


TRICHOCORIXELLA MEXICANA
PALMACORIXA GILLETTEI
P GILLETTEI CONFLUENS
P BUENOI
P NANA
P NANA WALLEYI
0 50 100 200 300
0 100 200 300
0 100 200 400 600
70
80
90
80
70
60
50
40
30
20
10

Corisella Lundblad

1928. Lundblad, O. Zoolog. Anzeiger, Leipzig, LXXIX, pp. 158-159.
1928. Lundblad, O. Entomologisk Tidskrift, XLVIII, Häft 4, p. 222.
1935. Poisson, R. Archives de Zoologie Experimentale et Générale, LXXVII, p. 458.
1942. Hungerford, H. B. Jl. Kansas Ent. Soc., XV, p. 68
1948. Walton, G. A. Trans. Soc. for British Entomology VIII, p. 157. (As subg. of *Trichocorixa* Kirk.)

In this genus the dorsal surface is smooth, shining, never more than faintly rugulose except on the pronotum. Hemelytra clothed with fine hairs. Lateral lobe of prothorax elongate, tongue-like. Front tibia of male rather long, produced above and provided with a fleshy pad or disk. The male pala triangular and provided with two rows of pegs. Male strigil dextral. Membranal suture marked by an oblique pale stripe as pointed out by Doctor Jaczewski.

Genotype: *C. mercenaria* Say.

Comparative notes: Doctor Lundblad gave as his diagnosis of the genus the following: "Takes a middle position in the structural characters between *Ectemnostegella* and *Ectemnostega.* Stridulatory pegs as in the above genera. The tibia produced distally as in *Ectemnostega.* The front margin of the hemelytra lacks the peculiar angle which is present in *Ectemnostega.* Pronotal stripes small, upper side not swollen. Hind wings well developed. Asymmetry of male dextral. A strigil is developed."

One cannot say, however, that the front margin of the hemelytra lacks the peculiar angle found in *Ectemnostega* for in a long series of females of *Corisella mercenaria* (Say) one finds all graduations from sharply right angulate breaks in the anterior margin to sloping expansions.

Distribution: Western United States and Mexico with one species, *C. tarsalis* (Fieber), extending eastward to Pennsylvania.

KEY TO CORISELLA LUNDBLAD

1. Size small, never more than 6.5 mm. long; an occasional female may attain nearly 6 5 mm. 2
Size larger, over 6.5 mm long*. 6
2 (1) Both segments of hind tarsus brown . . . . . *C. tarsalis* (Fieb) [= *C tumida* (Uhl.)] (See p 260)
First segment of hind tarsus at least, yellow, not brown. 3
3. (2) Pronotum without a median longitudinal carina on anterior fourth; flight wings often reduced; ventral surface of hind femur pubescent for more than one-third its length 4
Pronotum with a median longitudinal carina on anterior fourth; flight wings normal; ventral surface of hind femur pubescent for less than one-third its length 5

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* An occasional female of *C mercenaria* will run here, but is easily separated from the other species by the hair tufts on the abdominal venter and the angular bend in the margin of the hemelytra. A few unusually small males of *C. edulis* are shorter than 6 5 mm.

4. (3) In brachypterous forms pronotum very short, not more than two-thirds length of vertex; middle tarsus only slightly more than one-half length of tibia; under side of hind femur about half pilose....... . . *C. tarascana* Jacz. (See p. 264)

In brachypterous forms pronotum nearly as long as length of vertex; middle tarsus at least two-thirds length of tibia; under side of hind femur slightly less than half pilose . . ..*C. hidalgoensis* n. sp. (See p. 266)

5. (3) Pronotum faintly rastrate; second segment of hind tarsus usually embrowned; synthlipsis not much broader than rear margin of an eye. Postocular space at its middle at least two times the diameter of an eye facet.
C. decolor (Uhler)
[= *C. dispersa* (Uhl.)]
(See p. 267)

Pronotum smooth, shining; hind tarsus not embrowned; synthlipsis much broader than rear margin of an eye; postocular space at its middle narrow, little more than the diameter of an eye facet. Female with a pair of hair tufts on the sixth ventral abdominal segment.. .. . *C. mercenaria* (Say) (See p 272)

6. (1) The dark markings of hemelytra usually in definite longitudinal series, the male pala not broader than the tibia, or at least the dorsal part not projecting above the tibia. Male vertex plainly produced. Pruinose area on corial side of claval suture long. The rear margin of last ventral abdominal segment of female nearly straight . ... *C. edulis* (Champ.) (See p. 275)

The dark markings of hemelytra usually not in definite longitudinal series. The male pala broader than the tibia, its dorsal margin projecting above the tibia. Male vertex not plainly produced. Pruinose area on corial side of claval suture short Rear margin of last ventral abdominal segment of female broadly medianly produced...... . ... *C. inscripta* (Uhl) (See p 279)

Corisella tarsalis (Fieber)

(Plate XLIII, figs. 1, 1a-1c)

1851. *Corisa tarsalis* Fieber, F. X Species Generis Corisa, pp. 19-20, Tab I, fig. 13. (Desc. from Pa.)

1877. *Corixa tumida* Uhler, P. R. Bull. U. S. Geol. Geog. Survey III, p. 454

1895. *Corisa tumida*, Gillette, C. P. and Baker, C. F. Hemiptera of Colorado, p 64 (Bull. 31 of Colorado Agri Exp. Sta.).

1909. *Arctocorisa tarsalis*, Kirkaldy, G. W. and Torre-Bueno, J. R. de la Catalogue in Proc. Ent. Soc. Washington X, p. 197.

1917. *Arctocorixa tarsalis* (Fieb.) Van Duzee, E. P. Catalogue of the Hemiptera of America, p. 484.

1931. *Corisella texcocana* Jaczewski, T. Annales Musei Zoologici Polonici IX, No 15, p. 202, Pl. XXVI, figs. 21-23; Pl. XXVII, figs. 24-31; Pl. XXIX, fig. 62.

1931. *Sigara tarsalis* (Fieb.) Lundblad, O. Zoologischer Anzeiger, Bd. 96, p. 86. (Found type in Zool. Mus. Halle—a damaged female and did not redescribe)

1933. *Corisella texcocana*, Ancona, H. L. Anales del Instituto de Biologia IV, No. 1, pp. 53, 67, 68, fig. 17 F. (*In* his El Ahuautle de Texcoco.)

1936. *Corisella tumida*, Walley, G. Stuart. Can. Ent. LXVIII, pp. 62-68, Pl. III, figs. 1-6.

Size: Length 5.25 mm. to 6.6 mm.; width across the head 1.47 mm. to 1.93 mm.

Color: General facies medium to light. Ground color dusky yellow. Pronotum with about ten narrow transverse blackish bars which are narrower than the interspaces. Bars before and behind slightly abbreviated laterally, almost entire; those at the middle may be interrupted, split or furcate. Clavus weakly maculate at base, beyond with brownish reticulae from outer to inner margins, slightly massed along the middle but not forming series or stripes. Corium and membrane similarly reticulate, the latter may have brownish marks predominant with the margin embrowned. The embolium pale with a dark spot at its tip. Thoracic venter and legs yellow. Dorsum and venter of abdomen nearly black in males and often so in females. Apex of middle tarsi and entire hind tarsi brown.

Structural characteristics: Male with vertex noticeably tumid, almost acuminate, the rounded apex with a definite narrow carina (see Plate XLIII, fig. 1b). Face strongly flattened, the flattened area not as broad as interocular space, its upper surface with fine, very short, erect hairs. The female head of normal shape. Interocular space broader than an eye. Antennal segments 1 : 2 : 3 : 4 :: 20 : 12 : 37 : 18 ♂ ; 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 20 ♀. Disk of pronotum polished, only faintly rastrate, a slight carina on anterior third; posterior margin evenly rounded. Hemelytra shining, not rastrate but very faintly roughened. Mesoepimeron slender, the osteole of scent gland just laterad of its tip. Metaxyphus short, triangular. The front femur of male with stridular patch of pegs near its base, the tibia as long as the pala with a stout, erect peg below its apex, and the pala as shown in Plate XLIII, figure 1, with only a single or double conspicuous peg in the upper row position. The middle leg: femur : tibia : tarsus : claws :: 100 : 44.8 : 30.4 : 44.8. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.8 : 116.6 : 46.6. The under side of hind femur bare and shining, the pilose area confined to the base and rear margin. The abdominal dorsum of male as shown on Plate XLIII, figure 1c. The strigil small, of three combs, on a rather long petiole. The male genital capsule as shown on Plate XLIII, figure 1a.

Location of types: The type of *Corixa tarsalis* Fieber is a female located in the museum at Halle, Germany, where it was examined by me in 1928 and labeled "type." It was a broken specimen bearing the label "*C. tarsalis* Fieb. Penns. Zm." The pattern of the hemelytra is like that of *A. utahensis* paratype I had with me but the species is smaller. In frontal view the eyes seem small and the beak slender. The hind tarsus (last segment) is embrowned and the front legs small. This is the species that Uhler described from Colorado as *C. tumida* but I have seen specimens from Philadelphia, Pennsylvania, and from Cold Springs Harbor, New York. The only other species with an embrowned hind tarsus is *A. dakotensis* Hungerford. This is a larger species and not yet recorded from Pennsylvania.

The type of *C. tumida* Uhler from Sloan Lake near Denver, Colorado, is in the U. S. National Museum. The type series of *Corisella texcocana* Jaczewski was in the Polish Museum and four specimens (2 males and 2 females) of this series were sent by Doctor Jaczewski to the Francis Huntington Snow Collection, University of Kansas.

Comparative notes: This species is easily recognized by the embrowned hind tarsus and by the front leg of the male as shown on Plate XLIII.

Data on distribution: (Plate XLVI.) This species under the names *C. tarsalis* Fieber, *C. tumida* Uhler and *Corisella texcocana* Jaczewski has been recorded as follows: *C. tarsalis* Fieber, "Penns. Zm."; *C. tumida* Uhler, Colorado, Sloan's Lake, west of Denver, and from temporary pools in the suburbs of Denver by Packard and Uhler; "Denver, Colorado, July 12, 1903, Van Duzee collector," reported in the California Academy of Science by Walley; *Corisella texcocana* Jaczewski, Texcoco, Mexico, August 4, 1929, 15 males, 50 females, T. Jaczewski.

In addition to the above we have or have seen the following:

CANADA: Manitoba, Dauphin, 1935, Mrs. M. E. Hippesley, 1 male (U. S. N. M.).

U. S. A.: *New York:* Cold Springs Harbor, L. I., July 28, 1920, Priscilla Butler, 1 male.

Pennsylvania: Philadelphia, Oct. 18, 1908, G. M. Greene, male and female (U. S. N. M.).

Wisconsin: Parco, Aug. 22, 1938, R. I. Sailer, 1 female.

South Dakota: Blunt, July 19, 1937, R. H. Beamer, 3 females; Burdette, July 20, 1937, C. L. Johnston, 11 males, 9 females; Chamberlain, Sept. 9, 1939 and June 13, 1940, H. C. Severin; Clear Lake, Aug. 11, 1939, H. C. Severin; Columbia, Sand Lake Refuge, Sept. 24, 1939, H. C. Severin; Dixon, May 26, 1940, G. B. Spawn; Eureka, June 22, 1939, H. C. Severin, 1 male; Ft. Pierre, July 20, 1939, 10 miles south, H. C. Severin; Gann Valley, June 21, 1940, 3 miles south, H. C. Severin; Iona, 2 miles west, June 11, 1940, H. C. Severin; Isabel, June 25, 1940, H. C. Severin; Leola, 4 miles west, July 24, 1940, H. C. Severin; Martin, under neon lights, June 20, 1940, H. C. Severin; McLaughlin, June 21, 1939; Miller, July 20, 1937, R. H. Beamer; Mission Hill, 8 miles west, Sept. 5, 1940, H. C. Severin; Nisland, June 15, 1941, H. C. Severin; Oakwood, Brookings Co., Aug. 11, 1939, H. C. Severin; Phillip Junction, Sept. 5, 1940, H. C. Severin; Pine Ridge, field pond, Sept. 6, 1940, H. C. Severin; also June 17, 1941; Rapid City, June 18, 1941, H. C. Severin; Redfield, July 20, 1937, R. H. Beamer, 2 females; Reva, June 16, 1941, H. C. Severin; Rosebud, 3 miles east, Sept. 5, 1940, H. C. Severin; Selby, Aug. 11, 1942, G. B. Spawn; Waubay Refuge, alkali water, June 22, 1940, H. C. Severin; Walsey, 8 miles south, June 24, 1939, H. C. Severin; Winner, Sept. 8, 1939, G. B. Spawn; Wood, July 23, 1939, H. C. Severin.

Oklahoma: Cimarron Co., Kenton, July 5, 1926, T. H. Hubbell, 5 males, 9 females (Mich. U.).

Colorado: Colorado Springs, 5,915 ft., Aug., E. Stucker, 1 female; Denver, July 16, 1909, W. J. Gerhard (Parshley); Fruita, Aug. 15, 1936, M. B. Jackson, 7 males, 9 females; Hadley, Sept. 22, 1927, P. A. Readio, 1 female; Hillside, 6 miles south, Aug. 25, 1941, H. C. Severin; La Junta, Aug. 22, 1927, L. D. Anderson, 1 male, 6 females; Las Animas Co., Sept. 22, 1927, P. A. Readio, 5 males, 9 females; same place, R. H. Beamer, 4 males, 1 female; Lamar, Aug. 22, 1927, P. A. Readio, 3 males, 2 females; Maybell, Aug. 18, 1940, L. C. Kuitert, 3 males, 3 females; western Colorado, Oct. 28, 1921, Grace Wiley, 1 male, 4 females.

Utah: Cisco, Sept. 28, 1921, Grace Wiley, 4 males, 15 females; Cisco, Aug. 17, 1929, L. D. Anderson, 3 males, 3 females; eastern Utah, Sept. 28, 1921, Grace Wiley, 2 males; Emery Co., Aug. 22, 1921, Grace Wiley, 1 male, 3 females; Duchesne, Aug. 17, 1940, L. C. Kuitert, 1 male, 3 females; Goshen, Aug. 16, 1940, L. C. Kuitert, 11 males, 6 females; Spanish Fork, Aug. 15, 1940, L. C. Kuitert, 8 males, 9 females.

Montana: Broadwater Co., L. Sewall, June 20, 1941, G. K. MacMillan (Carn.) 1 male.

California: Mammoth Lakes, July 29, 1940, L. C. Kuitert, 3 males, 1 female.

Arizona: Apache Co., Aug. 16, 1927, R. H. Beamer, 2 males, 6 females; Coconimo Co., Aug. 13, 1927, P. A. Readio, 1 male, 2 females; Foxborough Ranch, Aug. 1, 1936, Owen Bryant; Navajo Co., Aug. 15, 1927, R. H. Beamer, 1 female; Oak Creek Canyon, July 9, 1941, R. H. Beamer, 1 female; Pima Co., Aug. 16, 1927, P. A. Readio, 1 male; St. Johns, July 26, 1936, M. B. Jackson, 9 males, 11 females;

Santa Cruz Co., Aug. 4, 1927, P. A. Readio, 1 male; Tucson, 1935, Owen Bryant; Yavapai Co., Aug. 9, 1927, R. H. Beamer, 1 male, 1 female; Yavapai Co., June 9, 1937, L. K. Gloyd, 1 male, 4 females (Mich. U.).

New Mexico: Chaves Co., July 8, 1927, R. H. Beamer, 1 male, 2 females; Faywood, May 24, W. J. Gerhard (Parshley); Moriarty, June 23, 1941, R. H. Beamer, 1 female; Santa Cruz, Aug. 20, 1927, R. H. Beamer, 1 female; Santa Fé, July 20, 1936, J. D. Beamer, 1 male; Silver City, July 22, 1936, M. B. Jackson, 1 female; Silver City, July 24, 1936, José Hidalgo, 1 female; Socorro Co., Aug. 18, 1927, P. A. Readio, 1 male, 4 females; Wagonmound, July 18, 1936, M. B. Jackson, 6 males, 9 females.

Texas: Cedar Lane, Aug. 9, 1928, R. H. Beamer, 2 females; Presidio Co., July 16, 1927, R. H. Beamer, 2 females; Randall Co., July 7, 1927, R. H. Beamer, 1 male, 3 females; Valentine, July 13, 1927, R. H. Beamer, 1 male, 1 female.

MEXICO: 15 klm. west of Jalapa, July 18, 1937, H. D. Thomas, 7 males, 8 females; Chihuahua, *Chihuahua,* July 15, 1938, H. D. Thomas, 1 male; Puebla, *Puebla,* July 14, 1937, H. D. Thomas, 3 males; Tehuacán, *Puebla,* July 18-25, 1937, H. D. Thomas, 1 male; *Mexico,* Texcoco, Aug. 4, 1929, T. Jaczewski.

Corisella tarascana Jaczewski

(Plate XLV, figs. 2, 2a-2c)

1931. *Corisella tarascana* Jaczewski, T. Annales Musei Zoologici Polonici, IX, No 15, p. 205-207, Pl. XXVII, figs. 25-31; Pl. XXIX, fig. 63

1933. *Corisella tarascana*, Ancona, H L. Anales del Instituto de Biologia, IX, No 1, p 67, fig. 17B (in his El Ahuautle de Texcoco)

1935. *Corisella tarascana,* Poisson, R. Archives de Zool. Exp. et Gén, LXXVII, p 481.

Size: Length 4.3 mm. to 5 mm. Head width 1.4 mm. to 1.6 mm.

Color: General facies medium to light. Pronotum with five or six dark bands, narrower than the pale interspaces and more or less broken (in macropterous individuals there may be eight dark bands). Clavus with brown cross bands which may be broken or furcate and considerably narrower than the pale interspaces; remainder of hemelytral pattern reticulate, the brown figures sometimes fusing on the corium into two faint longitudinal series; apex of corium pale; membrane embrowned at tip, the left one pale interiorly; membranal suture marked by a pale oblique line; embolium more or less infuscated. Head, except rear margin of vertex, legs and thoracic venter usually pale; the abdominal venter of males may be nearly black; that of females pale but with last segment (anal lobes) nearly black.

Structural characteristics: Vertex of male produced in front into a blunt angle (see Plate XLV, fig. 2a); vertex of female somewhat produced. Interocular space broader than an eye. Frontal depression of male deep and broad, including inner angle of the eyes, and provided with a tuft of hairs at its apex Antennal segments 1 : 2 : 3 : 4 :: 15 : 12 : 30 : 10 ♂ ; 1 : 2 : 3 : 4 :: 15 : 14 : 30 : 11 ♀. Disk of pronotum in brachypterous specimens short, nearly three times as wide as long and only two-thirds as long as vertex in male. Pronotum very faintly rastrate, without carina. Hemelytra smooth. Mesoepimeron only moderately narrow, rounded at tip, the osteole of scent gland guarded by a broad fringe of conspicuous hairs. Metaxyphus short, broadly round at apex. The front femur of the male rather thick and short with a patch of very densely inserted thickened hairs near the base and below it about six longitudinal, short rows of pegs which resemble palar pegs but have hairlike apices; about five pegs in each row. The tibia thickened distally with a membranous process at base of the pala. The pala as shown on Plate XLV, figure 2. There may be five or six pegs in the upper row and four or five in the lower row. The middle leg: femur : tibia : tarsus : claws :: 100 : 46 : 26 : 36. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 83 : 103.8 : 41.5. The upper side of the hind femur with a row of about five short spines, lower side with about three spines; the lower side with fully half its surface pilose. The abdominal dorsum of male as shown on Plate XLV, figure 2c. The strigil with four combs on a pedicle. The central lobe of the seventh abdominal tergite feebly developed, deprived of long bristles. Male genital capsule as shown on Plate XLV, figure 2b.

Location of types: In the Polish Museum at Warsaw. The holotype male from Tizapán, Jalisco, Mexico, Aug. 11, 1929, T. Jaczewski. The type series included specimens from Pátzcuaro, Mich., Aug. 28, 1929, and some females questionably placed here from Xochimilco, D. F., and Tlalpam, D. F.

Comparative notes: This species is near our new species, *C hidalgoensis*, from which it is distinguished as indicated in the key.

Data on distribution: (Plate XLVI.) Besides Doctor Jaczewski's records we have the following in the Francis Huntington Snow Collection:

Mexico: *Michoacán:* Carapa, Sept. 18, 1938, H. D. Thomas, 12 females; Morelia, Sept. 4, 1938, H. D. Thomas, 4 females; Zamora, Sept. 8, 1938, H. D. Thomas, 3 males, 9 females; 20 miles east of

Zitácuaro, Oct. 28, 1938, H. D. Thomas, 3 females; Pátzcuaro, Sept. 2, 1938, H. D. Thomas, 16 males, 80 females.

Jalisco: Unión de Tula, Sept. 10, 1938, H. D. Thomas, 22 females.

Hidalgo: Durango, Sept. 4, 1938, H. D. Thomas, 1 male, 2 females.

México: D. F., April 22-25, 1910, 2 females.

Morelos: Tres Cumbres, 70 klm. south Mexico City, Oct. 1, 1936, H. D. Thomas, 24 males, 24 females.

Corisella hidalgoensis n. sp.

(Plate XLV, figs 1, 1a-1c)

Size: Length 4.4 mm. to 5.5 mm.; width of head 1.6 mm. to 1.9 mm.

Color: General facies medium to light. Pronotum in brachypterous forms with about seven dark bands which are narrower than the pale interspaces and more or less broken in the middle of the disk. (In macropterous individuals there may be nine or ten dark bands.) Clavus with brown bands more or less broken or effaced on basal third; remainder of hemelytral pattern reticulate, the brown figures sometimes fusing on the corium in three or four faint longitudinal series; membranal suture marked by a pale oblique line; the brown figures fusing submarginally; the left membrane pale interiorly; embolium pale; head, legs and thoracic venter-pale; abdomen of male may be nearly black.

Structural characteristics: Vertex of male moderately produced in front as shown on Plate XLV, figure 1a. Vertex of female normal. Interocular space equal to width of an eye. Frontal depression of the male deep and broad, embracing inner angle of the eyes, its surface with sparse covering of appressed hairs. Antennal segments 1 : 2 : 3 : 4 :: 16 : 12 : 30 : 16 ♂; 1 : 2 : 3 : 4 :: 16 : 15 : 32 : 16 ♀. Disk of pronotum in brachypterous specimens nearly as long as the vertex and a little more than a third as long as its width. Pronotum faintly rastrate without carina. Hemelytra smooth. Mesoepimeron narrow. Metaxyphus short, triangular. Front femur of male with inner basal half pilose but without the conspicuous stridulatory patches described for *C. tarascana* Jacz. The tibia and pala as shown on Plate XLV, figure 1. The middle leg: femur : tibia : tarsus : claws :: 100 : 44.8 : 30.4 : 43. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 85.8 : 100 : 42.9. The upper side of the hind femur with a row of six or seven short spines, lower side with about five spines; the lower side with less than half its surface pilose. The abdominal dorsum of male as shown on Plate XLV, figure 1c. The strigil of moderate size with seven combs, often partially covered by the hair tuft of the preceding segment. The seventh segment rather hairy behind the strigil. Male genital capsule as shown on Plate XLV, figure 1b.

Location of types: Holotype, allotype and 42 paratypes (27 males, 15 females). Labeled "Mexico 1938, H. D. Thomas, Real del Monte, Hidalgo, Sept. 23, 1938, No. 29" in the Francis Huntington Snow Entomological Collection, University of Kansas.

Comparative notes: This species is near *C. tarascana* Jaczewski but both sexes have the under side of hind femur less pilose and the males are readily distinguished from that species by the less prominent vertex, by the femur lacking the stridular peg patches, by the crowded upper peg row of the pala, by the larger strigil, abdominal hair tufts and by the different shape of the right clasper.

Data on distribution: (Plate XLVI.) In addition to the type series we have the following record: MEXICO: 20 mi. w. of San Luis Potosí, *San Luis Potosí*, Aug. 8, 1944, H. D. Thomas, 2 males.

Corisella decolor (Uhler)

(Plate XLIII, figs. 2, 2a-2c; wash drawing No. 10, Plate IV)

1871. *Corixa decolor* Uhler, P. R American Jl. Science, ser. 3, I, p. 106.
1875. *Corisa dispersa* Uhler, P. R. Wheeler's Surv 100th Merid. V, p 841, Pl. 42, fig. 7
1876 *Corisa decolor*, Uhler, P R. Bull U S. Geo Geog Surv. I, p. 340.
1877. *Corixa decolor*, Uhler, P. R. Bull. U S. Geol. Geog Surv III, p. 455
1893 *Corisa decolor*, Uhler, P. R. Proc. Ent. Soc Wash. II, p. 384.
1909. *Arctocorisa decolor*, Kirkaldy, G W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash X, p 195.
1909 *Arctocorisa dispersa*, Kirkaldy, G. W., and Torre-Bueno, J. R de la Catalogue *in* Proc Ent. Soc. Wash. X, p. 195.
1917. *Arctocorixa decolor*, Van Duzee, E. P. Catalogue of Hemiptera, p. 479
1917 *Arctocorixa dispersa*, Van Duzee, E. P. Catalogue of Hemiptera, p. 479.
1939. *Arctocorixa dispersa*, Millspaugh, Dick D Field and Lab., VII, No. 2, p 85

Size: Length 4 mm. to 5.88 mm.; width of head 1.36 mm. to 1.9 mm.

Color: General facies light to dark depending upon the width of the dark figures which may be slender or broad. Pronotum crossed by six or eight dark bands that may be much narrower than the pale interspaces, the first three effaced laterally or they may be broader than the interspaces. In either case the last three or four are united by the marginal brown line that marks the caudal margin of the pronotum. Clavus with brown bands more or less broken or effaced on basal third; remainder of hemelytral pattern reticulate with the brown bands mostly transverse; membranal suture marked by a pale oblique line; the left membrane pale interiorly; embolium white to embrowned with a dark spot beyond its apex; head, legs and thoracic venter pale; abdominal venter usually black in male.

Structural characteristics: Vertex of male moderately produced in front as shown on Plate XLIII, figure 2b. Vertex of female normal. Interocular space broader than an eye. Frontal depression of the male ovate, deep, not quite attaining inner angle of the eyes, its surface with covering of appressed hairs. The postocular space at its middle at least two times the diameter of an eye facet. Antennal segments: 1 : 2 : 3 : 4 :: 18 : 12 : 33 : 18 ♂ ; 1 : 2 : 3 : 4 :: 18 : 12 : 35 : 18 ♀ . Pronotum moderately rastrate with a median carina on its anterior fourth. Hemelytra shining; mesoepimeron narrow; metaxyphus short, triangular. Front femur of male with inner basal half pilose, the hairs thickened at their bases. The tibia and pala as shown on Plate XLIII, figure 2. The middle leg: femur : tibia : tarsus : claws :: 100 : 45.5 : 30.9 : 41.9. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.8 : 116.6 : 53.3. The upper side of the hind femur with a row of six or seven short spines, lower side with about five spines. The lower side of the femur nearly free of pilosity except at the base and along its rear margin. The abdominal dorsum of male as shown on Plate XLIII, figure 2c. The strigil may be as in the figure or made up of five or six regular rows. Male genital capsule as shown on Plate XLIII, figure 2a.

Location of types: The mutilated fragment of the *C. decolor* Uhler type and four specimens (one mutilated male and three females) of *C. dispersa* Uhler type series in the U. S. N. M. *Corixa decolor* Uhler was described in the American Journal of Science and Arts, Ser. 3, Vol. 1, p. 106, in 1871. The description was incorporated in A. S. Packard's paper "On Insects Inhabiting Salt Water, No. 2." This description seems to have been drawn from a single specimen for the last sentence of the description says, "The specimen described is a male which appears not to be fully mature. From Clear Lake." It must be noted here also that figure 7, *Corisa dispersa,* Plate XLII, in Wheeler's Survey 100th Meridian V, p. 841, Plate 42, figure 7, 1875, does not at all correspond to the original description in the same paper nor to the insects I find that are cotypes. In 1876 Uhler, in his "List of Hemiptera of the Region West of the Mississippi River" (Bull. 5, U. S. Geol. Geog. Surv., Vol. I), gives *C. decolor* and says, "From Clear Lake, California, collected by Professor Torrey. The soft and tender condition of the two specimens examined leaves a doubt of their being in fully matured condition. It is important to have full series of these insects from the various kinds of lakes, ponds, and streams, particularly from the alkaline ones, so that something may be settled respecting the influence of such waters upon them." In 1877 (U. S. Geol. Surv., Vol. III), reporting upon the "Insects collected by P. R. Uhler during the Explorations of 1875, including Monographs of the Families Cydnidae, Saldidae and the Hemiptera collected by A. S. Packard, Jr., M. D.," Doctor Uhler writes of *C. decolor*, "Found by Doctor Packard on July 27 in a brook flowing into Great Salt Lake, Utah, and in the lake." In 1893 Uhler, in the Proc. Ent. Soc. of Washington, Vol. II, p. 384, says of *Corisa decolor* Uhler, "Two specimens of large size were taken at the border of Salt Lake, July 4. The species was originally obtained from this same region but the specimens were smaller and less mature." I cannot locate these specimens. The above four references are the only records given in Van Duzee's Catalogue, 1917, and there has been none since. This means that the species has not been mentioned since 1893.

I have before me a specimen from the Uhler collection labeled "co-type, U. S. N. M." and "*Corixa decolor* Uhler, Borax Lake, Calif." This lacks head, prothorax, abdomen and all but one hind leg. Borax Lake, I understand, is a part of Clear Lake. From this and the description we must decide the identity of *C. decolor* Uhler. I have also a female specimen from the Uhler collection labeled "In brook running into Salt Lake, July 27, frequent" which must be the basis of Uhler's 1877 record. Both the male cotype and the Salt Lake specimen are the same as *Corisella dispersa* Uhler described in 1875. I have examined several collections of *Corisella dispersa* (Uhler) from Clear Lake, California, one of them consisting of six specimens that are labeled "Borax Lake" which is a portion of Clear Lake from which the type of *Corisella decolor* came. While the description of the head of *Corisella decolor* Uhler fits *Corisella tumida* (Uhler) better than it does *Corisella dispersa* (Uhler), nevertheless it can be applied to the latter and the type itself is certainly a teneral specimen of the latter. Unfortunately, therefore, the species we have known so well under the name *Corisella dispersa* (Uhler) must be called *Corisella decolor* (Uhler), which was described several years earlier, even if the name does not characterize fully developed specimens.

Comparative notes: This species is near *C. mercenaria* (Say) from which it can be distinguished by the characters given in the key.

Data on distribution: (Plate XLVI.) The published records are as follows: For *C. decolor* Uhler: Clear Lake, California (type loc.) and Great Salt Lake, Utah. For *C. dispersa* Uhler: Owens Valley, California (F. Bischoff) (type locality); "near Virginia City, Nevada, and in Texas," reported in the original description by Uhler. Besides examining the types above we have seen the following:

U. S. A: *California:* San Diego, 2 females (Uhler Coll.); San Diego Co., Apr. 9, 1930, C. and D. Martin, 26 males, 18 females; San Diego Co., Sept. 13, 1913, Van Duzee; Warner Springs, July 28, 1938, R. H. Beamer, 8 males, 9 females; Miramar, July 28, 1938, R. I. Sailer, 1 male, 1 female; L. Elsinore, Aug. 2, 1911, 3 males, 8 females; Laguna Beach, July 25, 1933, R. H. Beamer, 9 males, 11 females; same place, July, 1921 (Usinger Coll.); Tejon Pass, July 28, 1918, J. O. Martin, 1 male, 1 female; St. Helena, July 15, 1908 (Cornell), 3 males, 3 females; Fresno Co., Jacintos Barrancas, Kettleman Plains, June 4, 1907, J. C. Bradley (Cornell), 1 male, 3 females; Palo Alto, June 6, 1892 (Cornell), 1 male; Monrovia Canyon, Mar. 2, 1930, C. H. Martin, 4 males, 5 females; Los Angeles Co., July, 1 female; Santa Monica, July 31, 1911, 1 male; Santa Ana Canyon, Green River, Feb. 28, 1929, Grace Wiley (Lutz); near Long Beach, June 3, 1938, Grace Wiley (Lutz); Gaviota, July 19, 1933, R. H. Beamer, 1 male; Lompoc, Aug. 9, 1938, D. W. Craik, 2 males, 1 female; Tejon Pass, July 28, 1918, J. O. Martin, 1 male, 1 female; Onyx, July 23, 1940, L. C. Kuitert, 1 male; Lost Hills, July 19, 1936, G. D. Hanna (Calif. Acad. Sci.); Ontario, C. T. Dodds (Calif. Acad.); Idyllwild, Aug. 3, 1935, Jack Beamer, 9 males, 5 females; Carmel, L. S. Slevin (Calif. Acad.); Lucerne, July 17, 1935, Jack Beamer, 7 males, 8 females; Owens Valley, 2 females; Little Lake, June 7, 1929, R. L. Usinger (Calif. Acad.); Independence, June 13, 1929, R. L. Usinger (Calif. Acad.); Bishop, June 21, 1929; Little Lake, July 25, 1940, L. C. Kuitert, 2 females; Lone Pine, July 28, 1940, L. C. Kuitert, 8 males, 5 females; Mammoth Lakes, July 29, 1940, L. C. Kuitert, 2 males, 5 females; Mono Lake, July 3, 1940, L. C. Kuitert, 7 males, 6 females; Stanford U., 2 females; Berkeley, April 26, 1933, Jean Linsdale, 2 males, 2 females; Alameda, July 9, 1933, Jean Russell, 1 female; Oakland, May 3, 1921, C. T. Dodd, 1 female; Emery, May 14, 1921, C. T. Dodd, 1 female; Lafayette, July 14, 1932, R. H. Beamer, 9 males, 7 females; Vine Hill, July 5-10, 1911, F. E. Blaisdell (Calif. Acad.); Antioch, July 20, 1935, R. H. Beamer, 8 males, 7 females; Antioch, July 20, 1935, E. I. Beamer, 1 female; Folsom, 1885, 4 females;

Sacramento Co., July, 1 male, 1 female; Clarksburg, July 21, 1931, A. T. McClay (Calif. Acad.); Davis (lights), June 23, 1931, George Vansell, 2 males, 2 females; Davis, July 19, 1931, F. H. Wymore (Calif. Acad.); Golden Gate, July 17, 1933, R. H. Beamer, 1 female; Conoma, July 4, 1926, E. H. Nast (Calif. Acad.); Yuba Co., Coquillett, 1 male, 3 females; Sutter Co., June 1, 1934, E. R. Leach (Calif. Acad.); Lakeport, C. C. Deonier, July 17, 1941 (U. S. N. M.); Borax Lakes, Aug. 8, 1911, 1 male, 4 females; Gridley, June 10, 1931, Don Prentiss, 2 males, 1 female; Horse Camp, July 1, 1934, J. T. Howell (Calif. Acad.); Modoc Co., July 1, 1931, E. R. Leach (Calif. Acad.); Weed, June 29, 1935, R. H. Beamer, 1 female; Convict Lake, 7 females (Brues Coll.); California, Dec. 25, 1922, J. G. Needham, 2 females; Río Vista, Mar. 25, 1921, C. M. Packard, 1 female (U. S. N. M.); Franklin, Apr. 21, 1921, C. M. Packard, 1 female (U. S. N. M.); Davis, Aug. 9, 1933, E. P. Zimmerman, 1 male, 6 females (U. S. N. M.).

Oregon: Worden, July 1, 1935, R. H. Beamer, 12 males, 11 females; Modoc Point, July 1, 1935, Jack Beamer, 1 male, 4 females; same place and date, R. H. Beamer, 27 males, 29 females; Florence, July 11, 1935, R. H. Beamer, 1 male; Boardman, July 15, 1931, L. D. Anderson, 5 males, 4 females; Umatilla, July 14, 1931, L. D. Anderson, 1 female; Hot Lake, July 13, 1931, L. D. Anderson, 4 males, 9 females; same place and date, M. W. Sanderson, 5 males; so. of Worden, July 1, 1935, P. W. Oman, 13 males, 5 females (U. S. N. M.); Harney, Aug. 3, 1934, C. L. Hubbs (Mich. Coll.) 1 male.

Idaho: Burley, July 6, 1931, L. D. Anderson, 9 males, 13 females.

Nevada: Sunnyside, Hot Springs Exp. 1930, sp. no. 97, C. T. Brues, 1 male, 3 females; Esmeralda Co., Fish Lake, Sept. 5, 1934, C. L. Hubbs, 1 male (Mich. U.); Soda Lake, near Hazen, July 13, 1911, 2 males, 2 females; Fallon, Aug. 9, 1929, L. D. Anderson, 7 males, 1 female; Austin, Aug. 12, 1940, L. C. Kuitert, 4 males, 2 females; Fernley, June 26, 1935, R. H. Beamer, 1 male, 3 females; Carson City, Aug. 9, 1929, P. W. Oman, 8 males, 9 females; Gerlach, Hot Springs Exp. 1930, n. 100, C. T. Brues, 1 female; 29 mi. s. Winnemucca, 1 nymph; 65 mi. so. Wells, 1 female; Reno, Del Monte Ranch, July 10, 1939, P. Bartsch, 11 females (U. S. N. M.).

Utah: Hooper, at light, July 21, 1940, Knowlton and Dorst, 2 males, 6 females; Emery Co., Aug. 2, 1921, Mrs. Grace Wiley, 1 male, 3 females; Spanish Forks, Aug. 15, 1940, L. C. Kuitert, 15 males, 10 females; Lehi, April 9, 1930, G. F. Knowlton, 1 female; Goshen, Aug. 16, 1940, L. C. Kuitert, 15 males, 7 females; Corinna, Aug. 16, 1934, F. H. Gunnell, 3 males, 1 female (Utah Coll.); Wellsville, Aug. 16, 1934, Knowlton and Smith, 1 female (Utah Coll.); Locomotive Springs, April 10, 1930, G. F. Knowlton, 1 male, 1 female (Utah Coll.); Far West, Feb. 7, 1934, W. L. Thomas, 3 males (Utah Coll.); Spring Creek, R. E. Nye, 1 male, 3 females (Utah Coll.); Spanish Forks, June 18, 1938, G. F. Knowlton, 1 female (Utah Coll.); Granite, June, 1936, M. W. Allen, 2 males, 1 female (Utah Coll.); West Bountiful, Mar. 19, 1934, H. B. Stafford, 4 males, 2 females (Utah Coll.); Spanish Forks, Aug. 27, 1937, G. F. Knowlton, 1 female (Utah Coll.); Utah State Ag. Col. campus, July 28, 1937, Knowlton and Harmston, 1 female (Utah Coll.); Bear River Bay, Oct. 15, 1932, J. S. Stanford, 2 males, 2 females (Utah Coll.); Midvale, March 28, 1935, Knowlton and Thomas, 1 male (Utah Coll.); Provo, March 29, 1935, Knowlton and Thomas, 1 female (Utah Coll.); Logan, Aug. 13, 1934, F. H. Gunnell, 3 males, 7 females (Utah Coll.).

Colorado: Keeler, July 6, 1914, Wickham, 1 male, 1 female (Barber Coll.).

Wyoming: Lewis Lake, Hot Springs Exp. 1930, sp. no. 44, C. T. Brues, 2 males, 9 females; Squaw Lake (cold), Hot Springs Exp. 1930, sp. no. 49, C. T. Brues, 2 males, 2 females; Hot Springs Exp. 1930, C. T. Brues, 5 males, 14 females.

Montana: Broadwater Co., L. Sewall, June 20, 1941, G. K. MacMillan (Carnegie) 1 male, 1 female.

CANADA: *British Columbia:* Hope, Aug. 1, 1931, L. D. Anderson, 1 male.

Corisella mercenaria (Say)

(Plate XLIII, figs. 3, 3a-3c)

1832. *Corixa mercenaria* Say, Thomas. Heteroptera, New Harmony, p. 39.

1851. *Corixa mercenaria,* Fieber, F. X. Species Generis Corisa, p. 48.

1857. *Corixa mercenaria,* Say, Thomas. Fitch Reprint, p. 811 *in* Trans. N. Y. State Agri. Soc., XVII.

1857. *Corixa mercenaria,* Guérin-Ménéville, F. E. Le Moniteur Universel-Journal Officiel de l'Empire Français, numero 330, p. 1298, Nov. 26, 1857.

1857. *Corixa mercenaria,* Guérin-Ménéville, F. E. Bull. Soc. Zool. Acclim. IV, p. 581.

1857. *Corixa mercenaria,* Guérin-Ménéville, F. E. Bull. Soc. Ent. Fr. (3) V, pp. 148-151.

1857 *Corixa mecenaria,* Guérin-Ménéville, F. E. Revue et Magasin de Zoologie, 2nd Ser. X, p. 528.

1858 *Corixa meconaria,* Guérin-Ménéville, F. E. L'Illustration XXXII, Juillet 17, 1858, p. 47.

1869. *Corixa mecenaria,* Say, Thomas. Complete Writings I (ed. by LeConte), p. 367.

1876. *Corixa mercenaria,* Uhler, P. R. Bull. U. S. Geol. Geog. Surv. I, p. 341.

1876. *Corixa mercenaria,* Uhler, P. R. List of Hemiptera of the Region West of the Mississippi River, p. 75. (This is a reprint of above separately paginated.) (Says "Inhabits Mexico, California, etc.")

1898. *Corixa mercenaria,* Kirkaldy, G. W. Ent. Mo. Mag., XXXIV, p. 173.

1899 *Corixa mercenaria*, Kirkaldy, G. W. Revue d'Ent., XVIII, p. 95, (fig. egg).

1901. *Corixa mercenaria*, Champion, G. C Biol. Centr. Amer. Heter. II, p. 379, Pl. 22, fig. 23.

1909. *Arctocorisa mercenaria*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 196.

1917. *Arctocorixa mercenaria*, Van Duzee, E. P. Catalogue of Hemiptera, p. 482.

1926. *Arctocorixa mercenaria*, Blatchley, W. S. Heteroptera of Eastern North America, p. 1086

1928. *Corisella mercenaria*, Lundblad, O. Zool. Anzeiger, LXXIX, pp. 154-158, figs. 6-11.

1929. *Corixa mercenaria*, Hungerford, H. B. Pan-Pacific Ent., VI, No. 2, pp. 74-76 (reports finding Guérin's collection in Paris).

1929. *Corisella mercenaria*, Lundblad, O. Entomologisk Tidskrift, L, Haft 1, pp. 20-23 (compares with *C. edulis*).

1931. *Corisella mercenaria*, Jaczewski, T. Annales Musei Zoologici Polonici IX, Nr. 15, p. 202.

1933 *Corisella mercenaria*, Jaczewski, T. Annales Musei Zoologici Polonici IX, Nr. 21, p. 336.

1933. *Corisella mercenaria*, Ancona, H L Anales del Instituto de Biologia IV, No 1, pp. 53 and 67, fig. 17E (in his El Ahuautle de Texcoco).

Size: Length 4.8 mm. to 6.8 mm.; width across the head 1.6 mm. to 1.98 mm.

Color: A pale yellowish species. Pronotum crossed by eight or ten slender dark bands, some of which may be broken or furcated; the last four or five united by the marginal brown line that marks the caudal margin of the pronotum. Clavus with the slender brown lines more or less broken or effaced over the basal third; remainder of hemelytral pattern reticulate with slender brown bands, mostly transverse; membranal suture marked by a pale oblique line; embolium white with a brown spot beyond its apex; head and legs pale; middle of thoracic venter and abdomen may be black.

Structural characteristics: Vertex of the male moderately produced in front as shown on Plate XLIII, figure 3b and with a faint median carina; vertex of female also somewhat produced. Interocular space broader than an eye. Frontal depression of the male, deep, broadly ovate, its surface covered with appressed hairs; face of female slightly depressed. Postocular space narrow; at its middle less than twice the diameter of an eye facet. The antennal segments: 1 : 2 : 3 : 4 :: 18 : 14 : 38 : 20 ♂ ; 1 : 2 : 3 : 4 :: 18 : 15 : 40 : 20 ♀ . Pronotum smooth, shining, without rastrations, a median carina becoming faint caudally. Hemelytra smooth, shining. Mesoepimeron slender, with the scent gland orifice, which is guarded by a slender brush of hairs, just laterad of its tip, which is quite pointed. Metaxyphus triangular, slightly wider than long. Front femur of male with inner basal half pilose, the hairs thickened at their bases. The tibia and pala as shown on Plate XLIII, figure 3. The middle leg: femur : tibia : tarsus : claws :: 100 : 46.1 : 31.8 : 46.1. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 91.1 :

120.5 : 55.9. The upper side of hind femur with a row of about six short spines, lower side with about five spines; the lower side of the femur nearly free of pilosity except at extreme base and along its rear margin. The abdominal dorsum of male as shown on Plate XLIII, figure 3c. The female with a pair of hair tufts on the sixth ventral abdominal segment, and the hemelytra usually abruptly and subangularly dilated at the sides somewhat before the middle of the marginal area. Male genital capsule as shown on Plate XLIII, figure 3a.

Location of types: Say described this species from Mexico and wrote: "Passing through the market in the City of Mexico, I obtained a few specimens from the quantity of at least a peck, exposed for sale by an Aztec woman. They are made use of as food." His types are lost. However, the species is well known and has been figured by Champion and by Lundblad and further described by Jaczewski. Neotypes are hereby chosen from a series of specimens purchased as "Hautle" or Ahuautle by H. D. Thomas as they were being collected by the natives from Lake Texcoco. He also secured an excellent moving picture of this activity. These neotypes are in the Francis Huntington Snow Collection at the University of Kansas.

Comparative notes: This species is often found in Mexican markets mixed with *C. edulis*, *C tarsalis* (Fieb.) (=*texcocana* Jacz), *Krizousacorixa femorata* (Guér.), *K. azteca* Jacz. and *Notonecta unifasciata* Guér. Tons of these dried insects are also shipped abroad for bird or fish food, and their eggs are gathered for human food from Lake Texcoco, Mexico. Champion says that Thomas Gage, in 1625, appears to have been the first traveler who noticed that these insects were used for food in Mexico. Say's name, *C. mercenaria*, is, therefore, an appropriate one. The species is a little smaller than *C. edulis* (Champ.), and its dark markings on the hemelytra are not arranged in longitudinal series as they are in *C. edulis*. From *C. tarsalis* it is easily distinguished by having a pale hind tarsus instead of a dark one.

Data on distribution: (Plate XLVI.) Described from specimens offered for sale in a market place in Mexico City and probably reared in Lake Texcoco nearby. Uhler, 1876, mentions California, and Kirkaldy, 1898, gives New Mexico. Champion, 1901, records Lake of Texcoco and Lago de Chalco, both of which are near Mexico City. Jaczewski, 1931, reports 51 males, 90 females taken Aug. 4, [illegible] Texcoco. Jaczewski, 1933, says there are 12 specimens of this species in the British Museum labeled "Bolivia" but since they were imported to London as food for pheasants, it is not certain that they were actually collected in that country. It is our opinion that they were not. I have seen no specimens from California that would affirm Uhler's California record. I have before me a specimen labeled by Kirkaldy as *C. mercenaria* Say that is also labeled "Las Cruces, New Mexico, 8-6," "New Mexico, Tyler Townsend." This is the basis of Kirkaldy's New Mexico record but the specimen is *Corisella tarsalis* (Fieb.), a female. It appears that as yet there are no true records of *C. mercenaria* (Say) in the United States. The Francis Huntington Snow Collections have a good series labeled "Lake Texcoco, Mexico, July 26, 1937, H. D. Thomas," and four females labeled "Texcoco Lake, Mexico, A. Duges." It seems strange that the many collections made by H. D. Thomas in various parts of Mexico would not have included this species that is so remarkably abundant near Mexico City.

In the U. S. National Museum are the following: Brownsville, Texas (in Mexican food), Nov. 12, 1909, D. K. McMillan, 2 males, 2 females; "said to be in Nice, Mexico, all. exch. 1895", 3 females; Mexico, 2 males, 3 females.

Corisella edulis (Champion)

(Plate XLIV, figs 2, 2a-2c)

1901. *Corixa edulis* Champion, G. C. Biol. Centr. Amer. Heter. II, p. 380, Pl. XXII, fig. 24.

1909. *Arctocorisa edulis*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 195.

1917. *Arctocorixa edulis*, Van Duzee, E. P. Catalogue of Hemiptera, p. 480.

1925. *Arctocorixa edulis*, Hungerford, H. B. Bull. Brooklyn Ent. Soc. XX, p. 142 (records Kansas, Minnesota and the east).

1926. *Arctocorixa edulis* Blatchley, W. S. Heteroptera of Eastern North America, pp. 1073, 1075, 1076 and 1086.

1928. *Arctocorixa edulis*, Hungerford, H. B. Annals Ent. Soc. Amer. XXI, p. 141, Pl. VIII, figs. 9, 10 and 11 (reports reversed asymmetry).

1928. *Corisella edulis*, Lundblad, O. Zool. Anzeiger, LXXIX, p. 158 (corrects Blatchley's statement about asymmetry).

1929. *Corisella edulis*, Lundblad, O. Ent. Tidskrift L, Haft 1, pp. 20-24, figs. 3-4a-g, Pl. II, fig. 2.

1931. *Corisella edulis*, Jaczewski, T. Annales Musei Zoologici Polonici IX, Nr 15, pp. 207, 208.

1939. *Corisella edulis*, Millspaugh, Dick D. Field and Lab., VII, No. 2, p. 85.

1945. *Corisela edulis*, Griffith, M. E. Univ. of Kansas Sci. Bull. XXX, Pt. II, No. 14, pp. 281, 292.

Size: Length from 6.3 mm. in exceptionally small male to 7.98 mm. in large female; width of head 1.9 mm. to 2.48 mm.

Color: General facies light to medium. Pronotum crossed by ten or twelve very slender transverse dark bands which may be fainter in front and even effaced laterally. Clavus with pattern effaced at inner base; remainder of hemelytron closely marked with short, transverse, undulate, irregular, dark lines, the markings so arranged as to form four irregular longitudinal series; membranal suture marked by a pale, oblique line; the left membrane pale interiorly. Embolium white, sometimes embrowned. Head, legs and thoracic venter usually pale; abdominal venter of male usually black.

Structural characteristics: Vertex of male produced in front as shown on Plate XLIV, figure 2a; vertex of female slightly more produced than in *C. inscripta* (Uhler). Interocular space broader than an eye. Frontal depression of male ovate, deep and its surface covered with appressed hairs; face of female slightly depressed. Postocular space narrow except at inner angle of the eyes. Antennal segments: 1 : 2 : 3 : 4 :: 20 : 15 : 48 : 20 ♂; 1 : 2 : 3 : 4 :: 23 : 15 : 48 : 23 ♀. Pronotum smooth, shining, without median carina. Hemelytra shining; pruinose area on corial side of claval suture long. Mesoepimeron narrow, the scent gland osteole just laterad of its tip. Metaxyphus varies from as wide as long to a little longer than wide. Front femur of male with inner basal half pilose. The tibia and pala as shown on Plate XLIV, figure 2. The middle leg: femur : tibia : tarsus : claws :: 100 : 45.9 : 30.6 : 37.5. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 87.5 : 125 : 57.5. The upper side of the hind femur with a row of six or seven short spines, lower side with five or six spines. The lower side of hind femur nearly free of pilosity except at the base and along its rear margin. The abdominal dorsum of male as shown on Plate XLIV, figure 2c. The male genital capsule as shown on Plate XLIV, figure 2a. The last ventral abdominal segment of female with its rear margin nearly straight.

Location of types: Described by Champion from three males, two of them without heads, and one damaged female in the British Museum. These came from Lake of Texcoco, Mexico (A. Dugés), and were apparently obtained in the market place.

Comparative notes: This species and *C. inscripta* (Uhler) are larger species than other members of the genus and may be separated as indicated in the key.

Data on distribution: (Plate XLVI.) Described from México, D. F., the other published records are: Kansas, Minnesota and the east by Hungerford, 1925; Agricultural College, Miss., by Blatchley, 1926; from Texas as bird food in Berlin Museum, reported by Lundblad, 1[illegible]9. Those below are based on the present study.

MEXICO: *Oaxaca:* Oaxaca, Aug. 25, 1937, H. D. Thomas, 1 male.

Veracruz: 15 klm. west of Jalapa, July 18, 1937, H. D. Thomas, 14 males, 16 females.

Michoacán: Carapa, Oct. 8, 1938, H. D. Thomas, 4 males, 4 females; Zacupú, Sept. 1, 1938, L. J. Lipovsky, 2 males, 1 female; Morelia, Sept. 4, 1938, H. D. Thomas, 2 males, 3 females.

Jalisco: Tecolotlan, Sept. 17, 1938, H. D. Thomas, 9 males, 8 females; Chapala, Sept. 11, 1938, H. D. Thomas, 6 males, 9 females; Jalisco, Oct. 14, 1938, H. D. Thomas, 6 males, 58 females.

Chihuahua: Chihuahua, July 15, 1938, H. D. Thomas, 3 females; Juarez, June 18, 1934, Smith and Dunkle, 5 males, 18 females; 25 miles south of Chihuahua, July 11, 1938, L. J. Lipovsky, 8 males, 20 females.

Durango: Pasaje, Mar. 28, 1932, H. Smith, 2 males, 2 females.

Coahuila: Satillo, Nov. 21, 1932, L. D. Tuthill, 3 males, 3 females.

Tamaulipas: San José, April, 1910, 1 male; Nuevo Leon, July, 1934, E. A. Bowles, 1 male (U. S. N. M.).

Hidalgo: Agua Fría, July 28, 1937, H. D. Thomas, 6 males, 16 females; Río del Monte, Sept. 23, 1938, L. J. Lipovsky, 1 male, 1 female.

Puebla: Desert Pond, Dec. 17, 1940, F. N. Young, 2 males, 3 females; Tehuacán, July 18-25, 1937, H. D. Thomas, 9 males, 5 females; Puebla, July 24, 1937, H. D. Thomas, 13 males, 3 females; Cacaloapan, July 22, 1937, H. D. Thomas, 38 males, 46 females.

San Luis Potosí: San Luis Potosí, July 4-7, 1944, H. D. Thomas, 28 males, 27 females.

Distrito Federal: Chapultepec, Aug. 10, 1937, H. D. Thomas, 1 female; Lake Texcoco, July 26, 1937, H. D. Thomas, 15 males, 24 females; México, Oct., 1903, I. L. Hopper, 1 male, 1 female (U. S. N. M.); Mexico City, 1937, P. C. Clifford, 4 females (U. S. N. M.); from Spratt's Turtle Food, June 22, 1932, Bishopp, 2 males, 8 females.

U. S. A.: *Texas:* Brownsville, July, 2 females, Sept. 28, 1924, Weed and Spray, 2 males, 2 females (Field Mus.); from Mexican food, Nov. 1909, D. K. McMillan, 1 male, 1 female (U. S. N. M.); San Diego, 1 male, 1 female [Heidemann Col. (Cornell U.)]; Alfred, July 24, 1928, R. H. Beamer, 16 males, 23 females; Galveston, F. H. Snow, 1 male, 2 females; Colorado Co., April, 1922, Grace Wiley, 7 males, 12 females; Presidio Co., July 16, 1927, R. H.

Beamer, 4 males, 3 females; El Paso (intercepted in mail from Mexico), 2 females (U. S. N. M.); Eastland Co., May 24, 1922, 1 female, (U. S. N. M.); Randall Co., July 7, 1927, R. H. Beamer, 3 males; Chisos Mts., Aug., 1916, J. W. Green, 1 female (U. S. N. M.); Texas, 1 male, C. V. Riley Coll. (Cornell U.).

Arizona: Baboquivari Mts., July 16, 1932, R. H. Beamer, Jr., 8 males, 9 females; Baboquivari, July 18, 1932, R. H. Beamer, 1 female; southwest edge Tucson, July 20, 1932, R. H. Beamer, 3 males, 12 females; Tucson, May, 1937, W. Benedict, 4 males, 5 females; Ruby, July 13, 1940, L. C. Kuitert, 4 males, 11 females; Ruby, July 27, 1941, R. H. Beamer, 1 male, 1 female; Santa Cruz Co., Aug. 4, 1927, Beamer and Readio, 13 males, 18 females; Patagonia, Aug. 22, 1935, R. H. Beamer, 1 male, 1 female; Douglas, Aug., F. H. Snow, 1 male, 4 females; Benson, Sept. 13, 1935, Bryant, 2 males, 2 females; Chiricahua Mts., 5-6,000 ft., Aug. 16, 1927, Cave Creek, J. A. Kusche (Calif. Acad.); Cochise Co., July 29, 1927, R. H. Beamer, 3 females; Gila Co., Aug. 5, 1927, R. H. Beamer, 10 males, 16 females; Gila Bend, Aug. 13, 1935, R. H. Beamer, 1 male.

Nevada: Reno, Oct., 1939, La Rivers.

Oregon: Rogue River, Sept., C. R. Biederman, 1 male, 7 females.

Utah: Emery Co., Sept., 1921, Grace Wiley, 3 females; Cisco, Sept. 28, 1921, Grace Wiley, 1 male, 2 females; Eastern Utah, Sept. 28, 1922, Grace Wiley, 2 females; Springville, July 25, 1933, E. W. Anthony, 1 male (Utah Coll.).

Nebraska: Monroe Canyon, Sioux Co., Aug. 4, 1908, R. W. Dawson, 1 female (Nebr. Coll.).

Kansas: Morton Co., Aug. 3, 1924, C. O. Bare, 1 female; Meade Co., F. X. Williams, 1 female; Medora, July 2, 1927, P. A. Readio, 1 male; Douglas Co., Oct. 8, 1923, H. B. Hungerford, 1 male, 2 females; Douglas Co., Oct. 28, 1921, Robert Guntert, 1 male; Douglas Co., May 10, 1919, W. E. Hoffman, 1 female; Stubbs Pond, Lawrence, Nov. 17, 1922, H. B. Hungerford, 1 male, 1 female; Leavenworth Co., June 27, 1934, E. P. Breakey, 1 female; Doniphan Co., Oct. 24, 1924, Jean Linsdale, 1 female; same place, July 19, 1924, E. P. Breakey, 4 males, 1 female; same place, July 20, 1924, R. H. Beamer, 2 males, 1 female.

Oklahoma: Cimarron Co., July 5, 1926, T. H. Hubbell, 2 males (Mich. Coll.); Tulsa Co., Mar. 16, 1922, Grace Wiley, 1 male, 1 female.

Mississippi: Fulton, July 14, 1930, R. H. Beamer, 1 female; Ag. Col., Aug. 20, 1913, J. G. Hester, 1 female (Miss. Coll.).

Minnesota: Becker Co.

Iowa: Ames, Oct. 13, 1931, Hazel Beck, 2 males, 1 female. (U. S. N. M.); Ames, Nov. 5, 1931, Lloyd Andre, 1 male (U. S. N. M.).

Tennessee: Lake Co., July 8, 1941, Lucile Rice, 2 males, 10 females; Clarksville, Aug. 13, 1915, D. M. DeLong, 1 male (Drake Coll.).

District of Columbia: Washington, June 11, Oct. 9, 1890 (Heidemann Coll., Cornell U.).

Georgia: Wicksburg, July 22, 1929 (Ball Coll. in U. S. N. M.), 1 male.

Corisella inscripta (Uhler)

(Plate XLIV, figs 1, 1a-1c)

1894. *Corisa inscripta* Uhler, P. R. Proc. Calif. Acad. Sci. (Ser. 2), IV, p. 294

1901. *Corixa inscripta,* Champion, G C. Biol. Central Amer. Heteroptera II, p. 376

1909 *Arctocorisa inscripta,* Kirkaldy, G. W., and Torre-Bueno, J. R de la. Catalogue in Proc Ent. Soc. Wash. X, p. 195.

1917. *Arctocorixa inscripta,* Van Duzee, E. P. Catalogue of Hemiptera, p 481

1939 *Arctocorixa inscripta,* Millspaugh, Dick D. Field and Lab. VII, No 2, p. 85

Size: Length usually 7 mm. to 8 mm. but varies from 6.1 mm. in exceptionally small males to 8.4 mm. in females.

Color: General facies light to dark; the brown lines and figures a little broader and less often effaced than in *C. edulis;* those of hemelytra not in longitudinal series as they usually are in *C. edulis.* The pronotum crossed by ten to fifteen slender transverse brown bands, usually a dozen or more. The brown bands on the base of the clavus may be slender, broken or effaced but when effaced, the immaculate spot never covers more than one-fourth of clavus; elsewhere on hemelytra the brown lines are transverse, irregular, often broken or furcated and joined to others; membranal suture marked by a pale oblique line; left membrane pale interiorly; embolium usually white but may be embrowned. Head, legs and thoracic venter usually pale; abdominal venter of male usually black.

Structural characteristics: Vertex of male less produced than in *C. edulis.* See Plate XLIV, figure 1a. Vertex of female normal. Interocular space broader than an eye. Frontal depression of male broadly ovate, deep and covered with appressed hairs; face of female slightly depressed. Postocular space narrow except at inner angle of the eyes. Antennal segments: 1 : 2 : 3 : 4 :: 22 : 20 : 40 : 22 ♂; 1 : 2 : 3 : 4 :: 25 : 20 : 45 : 25 ♀. Pronotum smooth, shining, without a median carina. Hemelytra shining; pruinose area on corial side of claval suture short. Mesoepimeron narrow, the scent gland osteole just laterad of its tip. Metaxyphus triangular, wider than long. Front femur of male with inner basal half pilose. The tibia and pala as shown on Plate XLIV, figure 1. The middle leg: femur : tibia : tarsus : claws :: 100 : 43.9 : 33.3 : 39.9. The hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.5 : 125 : 57.5. The upper side of the hind femur with about six short spines in a row; lower side with four or five widely spaced short spines. The lower side of the hind femur nearly free of pilosity except at the base and along its rear margin. The abdominal dorsum of male as shown on Plate XLIV, figure 1c. The male genital capsule as shown on Plate XLIV, figure 1b. The last ventral abdominal segment of female with its rear margin medianly produced.

Location of types: Of the type series Uhler says "Specimens were collected near Cape St. Lucas by John Xanthus. Numerous specimens in the collection of the California Academy are labeled 'Cal. 2'." A pair of these "Cal. 2" are in the Uhler collection at the U. S. N. M. and are herewith designated as the lectotypes.

Comparative notes: Perhaps slightly more robust than *C. edulis* and even more variable in size. The two species have been badly mixed in collections. When unusually small males under 6.5 mm. are encountered of either species, the absence of a median carina on the pronotum will separate them from *C. decolor* and *C. mercenaria,* and their hind femora are less pilose than in *C. tarascana* and *C. hidalgoensis.* See section AA of the key for separating *C. inscripta* and *C. edulis.*

Data on distribution: (Plate XLVI.) The published records are as follows: Following the description Doctor Uhler says "The species is also known to me from specimens collected in Texas, Orizaba and elsewhere in Mexico, Arizona, New Mexico and southern Colorado." No one else since then has added to the above statement and I have not found the specimens upon which Uhler based his records. Our own records are:

California: San Diego Co., (Poway Val.), April 9, 1930, C. and D. Martin, 13 males, 8 females; San Diego Co., July 4, 1929, L. D. Anderson, 1 female; San Diego, G. H. Field, 2 males, 1 female (O. Heidemann Col., Cornell U.); Los Angeles Co. (near Long Beach), June 3, 1938, G. O. Wiley, 1 male, 1 female; San Clemente I., April 12, 1920, 2 males, 3 females; San Clemente I., April 12, 1923, J. G. Needham, 5 males, 20 females; Laguna Beach, July 25, 1923, R. H. Beamer, 11 males, 9 females; Los Angeles Co., 1 male, 1 female (Uhler Coll., U. S. N. M.); Los Angeles, April 21, 1930, 1 male (U.

S. N. M.); Lompoc, Aug. 9, 1938, D. W. Craik, 6 males, 8 females; Lost Hills, July, 1936, G. D. Hanna, 1 male; Idyllwild, Aug. 3, 1935, Jack Beamer, 1 male, 2 females; Monterey, May 5, 1923, L. S. Slevin (Calif. Acad.); Carmel, April 8, 1928, L. S. Slevin, (Calif. Acad.); Fresno, E. A. Schwarz, 1 male; Santa Cruz, Feb. 27, 1925, L. S. Slevin (Calif. Acad.); San Francisco, July 9, 1911, E. C. Van Dyke (Calif. Acad.); Berkeley, Sept. 23, 1915, E. C. Van Dyke (Calif. Acad.); Stockton, F. E. Blaisdell (Calif. Acad.); San Joaquin Co., July 15, 1909, L. S. Slevin (Calif. Acad.); Alpine, July 9, 1929, P. W. Oman, 1 female; Alpine, July 9, 1929, L. D. Anderson, 1 female; Alpine, July 9, 1929, R. H. Beamer, 1 female; Sutter Co., June 1, 1934, E. R. Leach (Calif. Acad.); Borax Lake in Lake Co., Aug. 8, 1911, 3 males, 2 females; Oroville, June 24, 1927, H. H. Keifer (Calif. Acad.); Franklin, Apr. 21, 1921, C. M. Packard, 3 males, 3 females (U. S. N. M.); Palo Alto, March 3, 1892, 1 male, 1 female, (Cornell); Imperial Co., Brawley, Aug. 8, 1914, J. C. Bradley, 1 male, 4 females (Cornell).

Oregon: Worden, July 1, 1935, R. H. Beamer, 3 males, 3 females; same date and place, R. H. Beamer, Jr., 3 males, 1 female; same date and place, J. D. Beamer, 2 males, 1 female; same date and place, Jean Russell, 2 males, 3 females; so. of Worden, July 1, 1935, P. W. Oman, 3 males, 1 female (U. S. N. M.).

Washington: Paha, June 9, 1920, L. McElroy, M. C. Lane, 1 male, 2 females (U. S. N. M.).

Idaho: Carey, July 27, 1926, J. S. Stanford, 1 male; Moscow, 1 male, 3 females (Bueno).

Utah: Cisco, Aug. 17, 1929, L. D. Anderson, 1 male; Cisco, Sept. 28, 1921, G. O. Wiley, 2 males; Emery Co., Sept. 17, 1921, G. O. Wiley, 1 male.

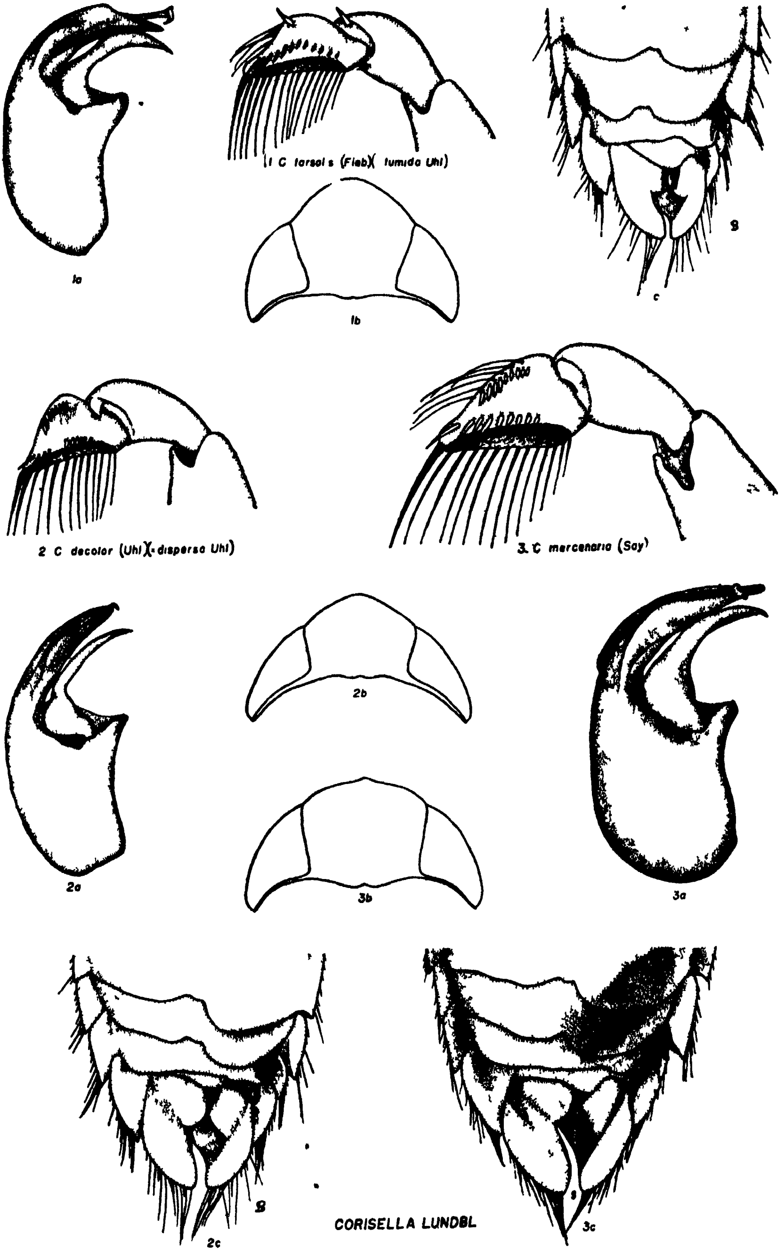
Arizona: Roosevelt Lake, Sept. 2, 1935, F. H. Parker, 1 female (U. S. N. M.).

PLATE XLIII

Corisella Lundblad

FIG. 1. *Corisella tarsalis* (Fieber) [=*tumida* (Abbott)]; pala of male.
FIG 1a. Genital capsule of male.
FIG. 1b. Head of male.
FIG. 1c. Dorsal view of male abdomen.
FIG. 2. *Corisella decolor* (Uhler) [=*dispersa* (Uhler)]; pala of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Head of male.
FIG. 2c. Dorsal view of male abdomen.
FIG. 3. *Corisella mercenaria* (Say); pala of male.
FIG. 3a Genital capsule of male.
FIG. 3b. Head of male.
FIG 3c. Dorsal view of male abdomen.

PLATE XLIII


1a
1 C tarsalis (Fieb)(tumida Uhl)
1b
♂
c
2 C decolor (Uhl)(= dispersa Uhl)
3 C mercenaria (Say)
2b
2a
3b
3a
♂
2c
3c

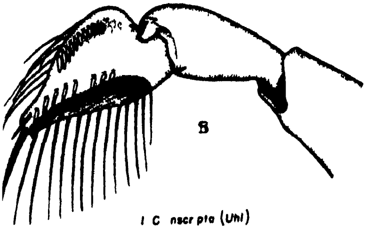
CORISELLA LUNDBL

PLATE XLIV

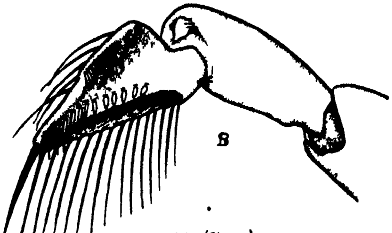
Corisella Lundblad

FIG 1 *Corisella inscripta* (Uhler), pala of male
FIG 1a Head of male
FIG 1b Genital capsule of male
FIG 1c Dorsal view of male abdomen
FIG 2 *Corisella edulis* (Champion), pala of male
FIG 2a Head of male
FIG 2b Genital capsule of male
FIG 2c Dorsal view of male abdomen

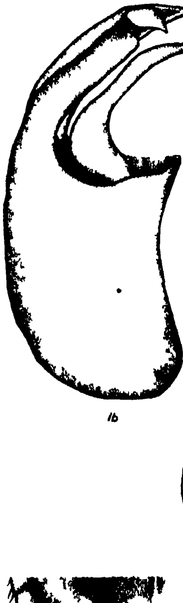
PLATE XLIV



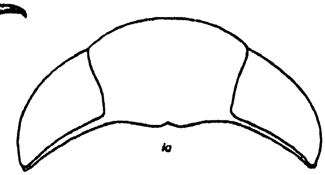
1 C inscripta (Uhl)



2 C edulis (Champ)



1b



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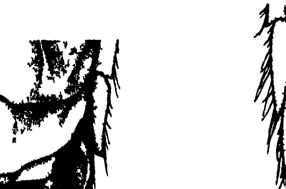

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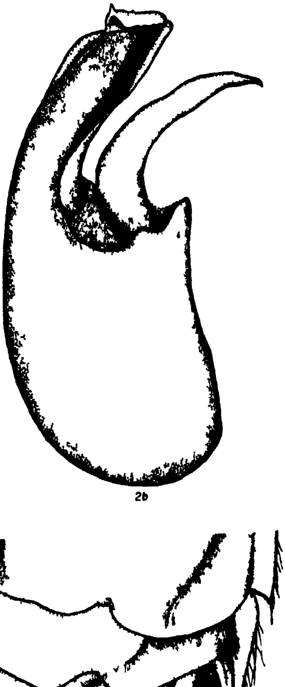

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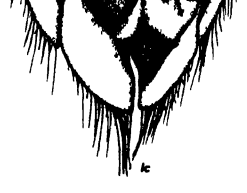
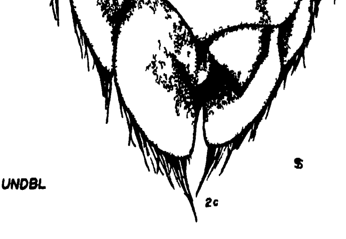


1c

CORISELLA LUNDBL



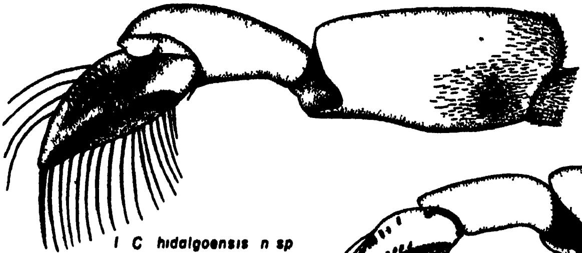
2c

PLATE XLV

Corisella Lundblad

FIG. 1. *Corisella hidalgoensis* n. sp , front leg of male
FIG. 1a Head of male.
FIG 1b Genital capsule of male.
FIG. 1c. Dorsal view of male abdomen.
FIG. 2. *Corisella tarascana* Jaczewski; front leg of male.
FIG. 2a Head of male
FIG. 2b Genital capsule of male.
FIG 2c Dorsal view of male abdomen

PLATE XLV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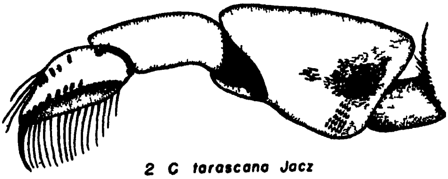
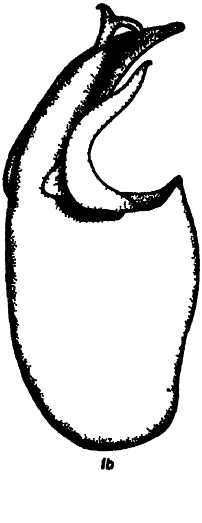

2 C tarascana Jacz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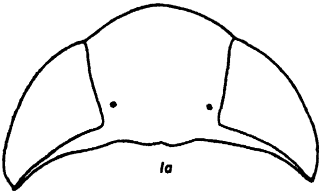
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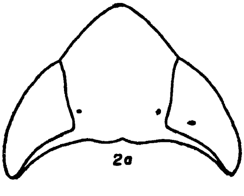
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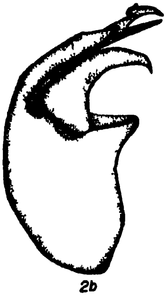
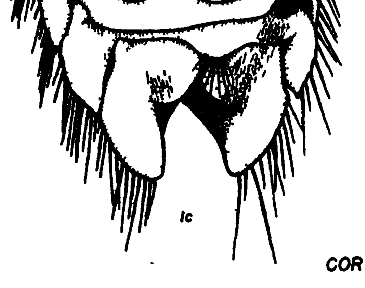
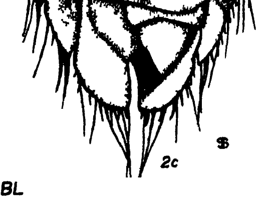

2b

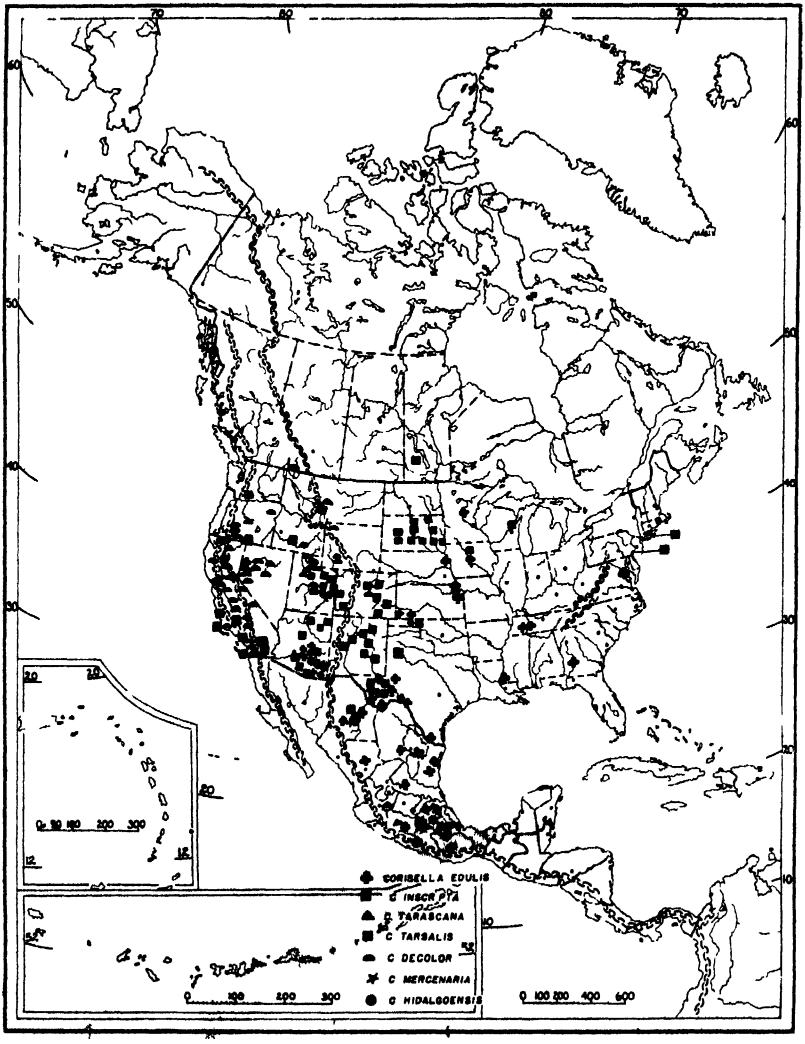

1c



2c

CORISELLA LUNDBL

PLATE XLVI


70
80
80
70
60
50
40
30
20
10
20
20
20
12
12
0 50 100 200 300
0 100 200 300
0 100 200 400 600
CORISELLA EDULIS
C INSCRIPTA
C TARASCANA
C TARSALIS
C DECOLOR
C MERCENARIA
C HIDALGOENSIS

The Genus Trichocorixa (Corixidae, Hemiptera)

By REECE I. SAILER
A. B., University of Kansas, 1938*

Submitted May, 1942, to the Department of Entomology and the Faculty of the Graduate School of the University of Kansas in partial fulfillment of the requirements for the degree of doctor of philosophy.

ABSTRACT

The GENUS *Trichocorixa* Kirkaldy

This paper constitutes a monographic revision of the species belonging to the genus *Trichocorixa*. Although primarily taxonomic, it includes all that is known of the biology and morphology of the genus.

Previous to this work, 13 species were ascribed to this genus. Among these species the following new synonymy is established: [*T. pulchra* (Blatchley)] = *T. minima* (Abbott), [*T. mariae* (Champion) and *T. wallengreni* (Stål)] = *T. reticulata* (G.-M.), [*T. burmeisterii* (Fieber)] = *T. calva* (Say). *T. dar-pomorza* Jaczewski is made a subspecies of *T. mendozana* Jacz. and *T. fenestrata* Walley a subspecies of *T. verticalis* (Fieber). *T. sellaris* (Abbott) becomes a variety of *T. verticalis* (Fieber). The following are described as new: The species *T. arizonensis* (Arizona), *T. beebei* (Galapagos Islands), *T. borealis* (Manitoba, etc.), *T. confusa* (Sonora), *T. kanza* (Kansas, etc.), *T. orinocoensis* (Venezuela), and *T. uhleri* (Colorado, etc.); and the subspecies *T. verticalis californica* (California), *T. verticalis interiores* (Texas, etc.), and *T. verticalis saltoni* (California).

New types are designated for *Trichocorixa macroceps* (Kirkaldy) and *T. calva* (Say), the original types having been lost. The females of the species *T. reticulata* (G.-M.) and *T. naias* (Kirkaldy) are described for the first time. As a result of the war the author was unable to study any types belonging to European museums; fortunately, however, these had all been either redescribed by capable European workers in recent years or had been studied by Hungerford during a tour of European museums in 1928.

The key to *Trichocorixa* separates both the males and females of

---

* Now employed by the Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, United States Department of Agriculture.

all the species. Extensive use is, for the first time, made of hemelytral characters. These are of particular importance in the separation of the females. Use is also made of the relative proportions of the head in both sexes. The dextral asymmetry of the venter of the female abdomen, common to most of the species, is observed and figured for the first time. The pala, genital claspers and dorsum of abdomen are utilized in separating the males.

Technique necessary for the dissection and study of the genus is explained.

A complete description is given for each of the species; the original description of previously described species is given only where there is or has been some confusion concerning its taxonomic status.

This paper contains 1 text figure and 18 plates which include figures illustrating specific structures, variation within species and, in some instances, are offered as evidence that one form is specifically identical to another. Four of these plates show the known distribution of the species belonging to the genus.

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The Genus Trichocorixa (Corixidae, Hemiptera)

Introduction

The genus *Trichocorixa* Kirkaldy includes a group of small, generally elongate corixids common throughout the Western Hemisphere. This genus has for one reason or other attracted but little attention from systematic workers. Little has been published concerning the biology, morphology or distribution of the species. Most of the papers dealing with the members of this genus are isolated descriptions of new species.

It is the purpose of the present author to compile all previous knowledge concerning this genus, to add such unpublished information as may be available, and to give a detailed discussion of the species with a key for their separation.

The writer wishes to express his appreciation to all who have assisted him in the preparation of this paper. Dr. H. B. Hungerford, of the University of Kansas, has been especially helpful. It was through his suggestion that the writer became interested in this problem. The material studied had been accumulated by Doctor Hungerford over a long period of years. In addition he had studied the type material located in European museums, taking valuable notes and making specimen comparisons without which the problem would have been greatly complicated, particularly in view of the inaccessibility of the European museums during the late war. Dr. R. H. Beamer, of the University of Kansas, proved a valuable source of advice and suggestion as to proper taxonomic procedure and general technique of study. Dr. Kathleen Doering, also of the University of Kansas, offered many helpful criticisms and suggestions concerning illustrations.

Review of Literature Pertaining to the Genus

Trichocorixa was erected by G. W. Kirkaldy (*21*, p. 118)[*] in 1908 as a subgenus of *Arctocorixa* and was distinguished from the typical subgenus as follows:

Tegminal hairs normal, tibia (male) rarely produced triangularly subg 1. *Arctocorisa* s str.
Tegminal hairs of two sorts, tibia of male produced triangularly (type *pygmaea*, Fieber) subg. 2. *Trichocorixa* nov.

It has since been found that many other corixids also typically bear two types of tegminal hair and some *Trichocorixa* little or no hair at all; however, it is from this character that the name of the genus is derived. [*Corisa*] *pygmaea* Fieber, 1851, appears to be the only species referred to the subgenus at this time. Kirkaldy also referred to *Trichocorixa* in his key (*2*, p. 118) as having asymmetry to the right. In 1918, Abbott (*1*, p. 87) stated that the characters mentioned by Kirkaldy were not constant enough to justify subgeneric distinction. He also noted that the forms belonging to this group were sinistral in their asymmetry; this, he believed, made them congeneric with European forms of *Corixa* (*Corisa* of Fieber). In 1927 Hungerford (*9*, p. 96) stated definitely that the "small American corixids which have the strigil on the left side of the abdomen in the male are not congeneric with the old world insects of the genus *Corixa*" and that they had to be referred to the genus *Trichocorixa* Kirkaldy, 1908.

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[*] Numbers in parentheses refer to bibliography

Thomas Say, in 1832, wrote what is believed by this author to be the first published description of a species of *Trichocorixa*, that of *Corixa calva* (*34*, p. 366).

Almost 20 years later, in 1851, Fieber (*7*, p. 24) described three species that have since been placed in *Trichocorixa*-*verticalis*, *pygmaea* and *burmeisteri*. All were described in the genus *Corisa* (*Corixa* of other authors). *T. pygmaea* (Fieber) was designated by Kirkaldy (*21*, p. 118) as the genotype; it has since been shown by Lundblad (*25*, p. 312) that *T. pygmaea* is a synonym of *T. verticalis* (Fieber).

Trichocorixa reticulata was described from Cuba by Guérin-Méněville in 1857 (*8*, p. 423) in the genus *Corisa* (*Corixa* of other authors). *T. wallengreni* was described by Stål in 1859 (*35*, p. 268). It was also placed in *Corixa*. This species has been found by the present author to be a synonym of *T. reticulata* (Guérin-Méněville).

In 1877 White (*39*, p. 114) described *Trichocorixa blackburni* from the Hawaiian Islands. This species has since been shown by Lundblad (*24*, p. 24) to be a synonym of *T. wallengreni* (Stål). Since the latter species has been found by the present author to be a synonym of *T. reticulata* (Guérin-Méněville), it is obvious that the Hawaiian form is also representative of this species.

It is not until 1901 that mention of this genus is again found in the literature. At that time G. C. Champion in Biologia Centrali-Americana described three new species of *Trichocorixa*, all of which were placed by him in the genus *Corixa*. Of these, one, *T. mariae*, has proved to be a synonym of *T. reticulata*; another, *T. sexlineata*, has undergone a change of name, for Kirkaldy in 1908 (*22*, p. 196) found this name to be preoccupied and called it *naias*. Jaczewski in 1927, being unacquainted with Kirkaldy's change of names for this form, proposed to call it *championi* because he had also found *C. sexlineata* Champion to be preoccupied by *Corisa sexlineata* Reuter; however, as was shown by H. B. Hungerford in 1928 (*10*, p. 174), Jaczewski's name was not valid because of Kirkaldy's previous designation. Champion's third species, *T. parvula*, is valid.

In 1913 J. F. Abbott, writing on the Corixidae of Georgia (*1*, pp. 85-86), described *T. sellaris*. This species has been found by the author to be a variety of *T. verticalis*. *T. minima* and the male of *T. macroceps* (Kirk.) were also described in this paper. *T. verticalis* was placed in this group for the first time, and the distribution of this species was given as "the length of the Atlantic seaboard from the gulf to New England." It was in this paper that Abbott submerged *Trichocorixa* Kirkaldy in *Corixa* (see above).

Except for mention of *Trichocorixa* by Van Duzee in his (1917) catalogue (*37*, p. 486), no further contributions were made to the knowledge of this genus until 1927, when T. Jaczewski described *T. mendozana* (*12*, p. 258); in this same paper is to be found the first general discussion of the genus *Trichocorixa*. The group was definitely established as having full generic rank, and with the exceptions of *T. macroceps* (Kirk.) and *T. minima* (Abbott), mention was made of all valid species which had been described previous to that time.

Lundblad's paper of 1929 (*25*, p. 312) is of particular value because of his generic diagnosis and his study of Fieber's types which enabled him to place *T. pygmaea* (Fieber) as a synonym of *T. verticalis* (Fieber). *T. verticalis* was redescribed and illustrated in a most satisfactory manner. Lundblad followed this paper by another in 1931 (*26*, pp. 85-95), which contains the most comprehensive study of the genus to be found in the literature prior to the publication of the present work. Fieber's types of *T. burmeisterii* were studied and redescribed. An attempt was made to write a key to the known species, and the synonymy of the species as of that date was listed. Type localities of all species were given.

In 1931 another species, *T. louisianae*, was described by Jaczewski (*17*, p. 516) from specimens sent him from New Orleans.

In 1933 Jaczewski described *T. dar-pomorza* from Parahyba, Brazil (*18*, p. 3). This species appears to be a subspecies of *T. mendozana* Jacz. 1939.

Since the completion of this revision in 1942 a paper has appeared, entitled "A Natural Classification of British Corixidae," by G. A. Walton, Trans. Soc. Brit. Ent. 8 (5) : 155-168. This work involves the definition of the genus *Trichocorixa,* and is considered in detail by H. B. Hungerford in his chapter dealing with generic concepts in the Corixidae. I am in complete accord with his views as expressed there.

MATERIAL STUDIED

Approximately 10,000 specimens of *Trichocorixa* were examined during the study of this genus. This included material from several hundred localities, ranging from Churchill, Manitoba, in the north to central Argentina in the south, and from Bermuda in the east to the Hawaiian Islands in the west. Types of all species and synonyms were studied with the following exceptions: Jaczewski's species, *T. mendozana* 1928, *T. louisianae* 1931 and *T. dar-pomorza* 1933, were inaccessible because of the disturbed state of world affairs; however, these species were readily identifiable from Jaczewski's descriptions. Fieber's types of *T. verticalis* 1851, *T. pygmaea* 1851, and *T. burmeisterii* 1851 were also unavailable for the same reason; however, these had been studied and very ably redescribed by O. Lundblad. The types of *T. naias* Kirk., based on *Corixa sexlineata* (Champ.) 1901 [= *T. reticulata* (Guérin)], *T. parvula* (Champ.) 1901, and *Corixa mariae* Champ. 1901 [= *T. reticulata* (Guerin)], had been studied at the British Museum by H. B. Hungerford, who kindly permitted the author to utilize his notes and penciled illustrations concerning these forms; a specimen of *T. reticulata,* which he had compared with the type in the Paris Museum, was also available and of great value in clearing up a knotty problem of synonymy connected with this species.

MORPHOLOGICAL NOTES

There has been no work published to date concerning the internal morphology of this genus, other than that dealing with the male genitalia. As a result of the descriptions and illustrations concerning individual species published by Lundblad and Jaczewski, the external morphology is better known; however, again this applies chiefly to characters of value in classification. Lundblad's text figures, illustrating forelegs, abdominal segments and claspers, are exceedingly well done. To the worker particularly interested in the morphology of this genus, recourse should be made to Melvin E. Griffith's, "The Environment, Life History and Structure of the Water Boatman" [Kans. Univ. Sci. Bul. 30 (14) 241-365, 1945]. That this study was made of *Ramphocorixa acuminata* (Uhler) does not in any way alter its value in the study of the more gross aspects of the morphology of *Trichocorixa.* The morphological terms used by this author are those accepted in Griffith's work, and as modified by taxonomic usage.

GENERAL APPEARANCE

The members of this genus are elongate often to the point of appearing slender, with the body above convex. The head, as is common in all corixids, overlaps the prothorax, which in turn overlaps the mesothorax. The pronotal disk varies greatly in both size and shape even within the same species, apparently depending upon extent of development of the wings. In the nearly wingless species, *T. macroceps* Kirk., it is about four times as wide as long; in the long-winged, robust form of *T. verticalis verticalis* described by Abbott from the Atlantic coast as *Corixa sellaris,* the pronotal disk is almost as long as wide, and nearly heart shaped. The scutellum is seldom visible; occasionally the apex can be seen. The hemelytra slightly exceed the apex of the abdomen, the right one overlapping the left when at rest.

The genus varies in length from 3.0 mm. (*T. macroceps*) to 5.7 mm. (*T. verticalis californica*), and in width of head from .90 mm. (*T. minima*) to 1.86 mm. (*T. verticalis californica*). There is remarkable variation of size within the species. Individuals of the same species from the same locality are usually quite uniform; however, those from different localities often show extreme variation in size and color.

With the exception of *T. macroceps* (Kirk.), the color pattern of the members of this genus is remarkably uniform. In *T. macroceps* there is a pronounced fusion of the hemelytral markings to form two rather heavy longitudinal lines, sometimes broken but usually quite evident. Throughout the rest of the genus the hemelytra markings are reticulose, with a tendency toward transverse lineation. In the medial basal area of the clavus these linear markings, in most instances, become oblique. The pronotal disk is crossed by a variable number of dark transverse lines.* The number and thickness of these lines vary a great deal within species and have very limited use as a specific character. The degree of coloration in all species appears to be quite unstable, very likely depending upon local environmental factors.

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* There has been much confusion as to the ground color of corixids, with opinion among those who have published papers concerning *Trichocorixa* about equally divided; Fieber, Blatchley, Lundblad and Jaczewski refer to yellow markings on a dark background, while Champion, Abbott, Walley and Hungerford refer to dark lines on a yellow background. It is this author's opinion that the latter usage is correct. The yellow coloration is quite obviously the result of a lack of pigment in the chitin. It is true that in many instances the major portion of the surface may be pigmented. This almost invariably results in a well-defined pattern. In forms found quite commonly among nearly all species of the genus where there occurs a minimum of pigmentation, the pattern is vestigial. The genus *Hesperocorixa* presents an example of complete pigmentation producing the opposite type of vestigial pattern [*H. kennicotti* (Abbott) and *H. brimleyi* (Abbott)]. In a rather well defined variety of *H. kennicotti*, a complete pattern typical of most corixids is shown This is significant, for in this latter form the dark lines are finely rastrate, while in the dark form of *H. kennicotti* the typical pattern can still be followed by observing the finely rastrate areas even though the pigmentation has spread solidly over the entire dorsal surface. This again indicates a crowding-out of the ground color by the pattern-producing pigment.

The pronotal disk and hemelytra are relatively smooth and shining. The hemelytra usually show scattered long hairs as well as short spinose setae.

CHARACTERS USED IN DIFFERENTIATION OF SPECIES

As with most corixids the males of *Trichocorixa* have altogether the lion's share of the specific characters by means of which the species are recognized. In only a few instances do the male and female have in common characters of taxonomic value. When present, however, they are of the following nature: The relation of the width of the synthlipsis to the width of the posterior margin of the eye as viewed from the dorsal aspect of the insect, coloration particularly of the pronotum, and size (the latter of limited value). The remaining, and by far the more important characters, are of secondary sexual nature and will be treated as such.

Males.—The Head: The relative shape of the frontal depression (fovea) represents a sexual dimorphism common to most corixids. It is produced by flattening or depressing of the frontoclypeal region and in most instances permits easy recognition of sexes throughout the family.

The Thorax and Appendages: The size, shape and color of the pronotal disk is of some importance, but of greater value are the front legs which are, as in all corixids, highly specialized. In *Trichocorixa* the foreleg consists of five chief divisions, the coxa, trochanter, femur, tibia and pala; the latter represents the tarsus and bears the pretarsus, a heavy spine at the end which represents a sixth segment. The tibia and pala are of chief interest here; the former is produced anteriorly over the pala and is characteristic of the genus; the pala is short, broad and thickened, roughly triangular in shape. The pala bears, besides numerous setae arranged along the various marginal areas to assist in feeding operations, a diagonal row of pegs along the anterior surface. The number and arrangement of the pegs, together with the relative shape of the pala, are of excellent diagnostic value.

The Abdomen: Here again is found a striking dimorphism. The males show a decided sinistral asymmetry, while the females show a moderate dextral asymmetry. In *Trichocorixa* this sinistral asymmetry of the males is considered of generic significance. Only four individuals from as many species among all males studied were found to show dextral asymmetry. This asymmetry is first evident in the fourth segment, where a lobe projects backward from the left posterior margin. The fifth segment presents a much more strongly produced lobe on the left side. However, the extreme left lateral portion of this tergum has become detached from the so-called laterotergite. This provides a groove into which the left anterior angle of the next segment fits. The sixth segment is constructed in much the same way, with the separation of the tergum from the left laterotergite more pronounced. The left lobe is usually less developed than is the preceding segment and bears a peculiar structure known as the strigil on its lateroposterior margin. This curious structure for which no function has ever been assigned is common throughout the family Corixidae. In the *Trichocorixa* it generally resembles a series of combs with the teeth directed inward. In this genus the shape and position of this structure is probably the most useful single character in the identification of the various species.

The tergum of the seventh segment is divided in such a way as to give the appearance of a complete absence of the left lobe characteristic of the preceding three segments, its place being taken by a much enlarged laterotergite. The shape of this structure is of considerable value in the separation of certain species of the genus, and in this paper is treated as the *tergal lobe of the seventh segment.*

The eighth segment is represented by the *posterior lobes* which form the posterior end of the abdomen. They appear as much enlarged laterotergal plates; generally these lobes are of about an equal size. The posterior lobes show a considerable degree of asymmetry in *Trichocorixa,* the right always being the more generalized. The left often shows characters of specific value in the shape of the lateroanterior margin. The right posterior lobe bears a prominent secondary lobe or flap along the dorsal mesal line. On the left posterior lobe this structure is suppressed, hardly noticeable from above. In this regard *Trichocorixa* appears more specialized than the remaining genera of the subfamily Corixinae.

The ninth segment, as is true of the males of all corixids, forms the heavily sclerotized capsular base of the male copulatory organ. In *Trichocorixa* it lies upon its left side, thus conforming with the sinistral asymmetry of the genus. The keel (posteriorly produced process grooved to fit the shaft of the phallic organs) is relatively broad and drawn to a point apically. Articulating with dorsal and ventral points on the inner margin of the posterior rim of the capsule are two somewhat sickle-shaped processes. These are the claspers or true *harpagones* (gonapophyses, styles and parameres of authors). The points of these claspers curve sharply to the left. The right clasper is heavily built, often bluntly rounded at the apex, with a triangular process on inner margin near the apex, and is provided with a large basal apodeme. The left clasper has the basal apodeme but little developed and is quite thin and bladelike. It is to these claspers that final recourse must usually be made in questions concerning the identity of a species.

Females.—In common with the females of all corixids, those of *Trichocorixa* present a generalized appearance. One interesting secondary sexual characteristic is shown by the hemelytra (see fig. 179), the embolar area of which differs considerably from that of the males and from that found in females of the other genera. The nodal furrow appears as a transverse, usually somewhat oblique line running from *Cu* to the costal margin (see fig. 179) across the pruinose groove occupying the intervening area. In most corixids this pruinose area or embolar groove (ectocorium, Hutchinson) from the nodal furrow to the apex is about half the length of the distance from that furrow to the base of the wing. In the females of *Trichocorixa* the area of the embolar groove beyond the nodal suture does not exceed one-third the length of the basal area. To the knowledge of the author, *Centrocorisa* Lundblad is the only related genus showing a somewhat similar position of the nodal furrow; however, here there is no dimorphism. In *Trichocorixa* vein *M* is nearly straight and appears to end some distance before the nodal suture, while in all other genera it appears somewhat curved, especially near its junction with *Cu* at the base of the nodal furrow. The outline of the costal margin is of great importance as a specific character, it being possible to identify the females of all species of *Trichocorixa* by this character alone.

The venter of the abdomen of many species of *Trichocorixa* shows a pronounced dextral asymmetry associated with the shape of the sixth segment and the arrangement of the pubescence on the sixth and seventh. *T. verticalis* (Fieber) and *T. mendozana* Jacz. present the most noticeably asymmetric sixth segment, while most species have a greater amount of pubescence (often bristly and in patches) on the right than on the left side of the venter.

TECHNIQUE

A binocular microscope is essential to study this group, since the characters used in identification are, in almost every instance, too small to detect with the naked eye. A magnification of 20 diameters appears ideal for general purposes, while careful study of the pala and the genital claspers requires a magnification of 60 diameters.

It is the author's experience that all species may be identified without dissecting the genital capsule from the abdomen. Ordinarily in the males it is only necessary to raise the wings to study the dorsum of the abdomen. To do this the specimen must be relaxed to prevent breakage. Best results are obtained by first touching the specimen with a camel's-hair brush that has been dipped in 80-percent alcohol, and then saturating the specimen with 5-percent alcohol. In 3 to 5 minutes the appendages can be moved freely.

When a study of the genitalia is desired the dissection should be made by one of two methods, depending upon whether the parts are to be mounted with or without a cover.

Procedure for Open Mount:

1. Relax the specimen according to the method described above, preferably for about 10 minutes.
2. Withdraw the pin if it is through the insect; however, it is not necessary to remove the insect from a cardboard point.
3. Take the specimen between the thumb and first finger with the head directed downward and the dorsum against the first finger.
4. Insert a very fine needle with a slightly bent point, basally between the posterior lobes with the point directed a little to the right.
5. Withdraw the needle, using a prying effect rather than a straight pull; otherwise the last three or four segments are likely to pull away.
6. By using two fine needles dissect the claspers from the capsule. This should be done under water or alcohol in order to avoid loss of parts or all of the capsule.
7. These may be taken directly from alcohol and mounted on celluloid slips over which a thin layer of cellulose acetate has been placed. It is important that they rest on the surface, for if they are embedded their outline may be altered by light refraction. These slips may be placed on the pin with the insect.

Procedure for Covered Mount:

1. Place the specimen in water which is then brought to a boil.
2. After being boiled for a few seconds, remove and place under water in a dissecting dish.
3. By using two fine needles dissect away the abdomen and right foreleg.
4. Boil these parts in a 10-percent solution of KOH until cleared of muscle tissue. This usually requires but a few seconds.
5. Place in water in a dissecting dish and remove the genital capsule. This is usually a simple operation since there is no longer any muscle tissue.
6. Place all parts in a stain consisting of a 1-percent aqueous solution of mercurochrome for about 5 minutes.
7. Remove and place in 80-percent alcohol.
8. Dissect the claspers away from the capsule. There is much less likelihood of loss if this dissection is made after the staining process.
9. Remove and place in 95-percent alcohol.
10. Place a small drop of diaphane on a celluloid slip.
11. Remove the parts from alcohol and embed in the diaphane. The abdomen should be placed dorsum up.
12. Cover with a 5 mm. circular glass cover slip, and by means of a fine needle arrange the parts advantageously between the slips.

The second procedure is superior for permanent mounts, inasmuch as dust may be removed readily from the surface; of more importance, however, is the ease with which the sclerites may be distinguished, and the lack of shriveled appearance common in the usual dried specimen.

The advantage of using celluloid slips, regardless of procedure, which permits the dissected parts to be mounted on the same pin with the insect, is obvious.

Description of the Genus *Trichocorixa* Kirkaldy

Genotype (*Corisa pygmaea* Fieber) = *T. verticalis* (Fieber)

Designated by Kirkaldy, 1908

1908. *Trichocorixa* Kirkaldy, G. W. The Canadian Entomologist, vol. 40, No 3, p. 117.

1913. *Corixa* Abbott, J. F. Bulletin of the Brooklyn Entomological Society, vol. 8, No 6, p. 87.

1925. *Trichocorixa*, Hungerford, H B. Bulletin of the Brooklyn Entomological Society, vol. 20, No 1, p. 20.

1927. *Trichocorixa*, Hungerford, H. B. Bulletin of the Brooklyn Entomological Society, vol. 22, No. 2, p. 96.

1927. *Arctocorixa*, subg. *Trichocorixa*, Jaczewski, T. Annales Musei Zoologici Polonici, vol. 6, No. 3, pp. 256-258.

1928 *Trichocorixa*, Jaczewski, T. Annales Musei Zoologici Polonici, vol 7, No. 1, pp. 59-60, pl. 3.

1929. *Trichocorixa,* Lundblad, O. Separat-Abdruck aus dem Archiv für Hydrobiologie und Planktonkunde, Bd. 20, pp. 312-317.

1931. *Trichocorixa,* Lundblad, O. Zoologischer Anzeiger, Bd 96, Haft 3/4, pp. 85-95.

1931. *Trichocorixa,* Hutchinson, G. E. American Naturalist, vol 45, December, pp. 573-574.

Writer's description.—Moderately small corixids, never exceeding 5.5 mm., appearing somewhat elongate. Pronotum covering the scutellum, usually showing well-defined black transverse lines; markings on corium reticulose to transverse, on clavus usually oblique basally, often obsolete at the inner basal angle. Hemelytra with scattered short, spinose setae and also showing a varying number of long hair-like setae. Legs and venter light yellow.

Males with moderate to deep fovea on frons without much hair on surface, anterior tibia produced apically over the base of the pala; the latter short, about as long as tibia, thick, roughly triangular with an oblique row of 13 to 20 pegs on the inner surface; abdominal asymmetry sinistral; a line drawn through costal margins at nodal suture barely exceeded by the apices of the clavi.

Females slightly larger than the males, with the apices of the clavi not reaching a line produced through the costal margins at the nodal furrows, the latter being situated near the end of the embolar groove.

KEY TO SPECIES

1. Nodal furrow appearing absent or at apex of embolar groove 2
Nodal furrow dividing the pruinose area of embolar groove into apical and basal portions 5
2 (1). Length of pronotal disk about one-fourth its width .. *T macroceps* (Kirkaldy) (p 327)
Length of pronotal disk one-third or more its width 3
3 (2). Width synthlipsis exceeding the width of an eye along hind margin as seen from above 5
Width synthlipsis less than the width of an eye along hind margin as seen from above 4
4 (3). With not more than five yellow lines separating the black transverse bands on pronotum; costal margin of hemelytra slightly emarginate anterior to nodal furrow (see fig. 180).......... *T. minima* (Abbott) (p. 332)
With six or more yellow lines separating the black bands, these sometimes broken; costal margin of hemelytra deeply emarginate just anterior to nodal furrow (see fig. 182).......... *T naias* (Kirkaldy) (p. 335)
5 (1) (3). Width of synthlipsis exceeding the width of an eye along hind margin as seen from above 9
Width of synthlipsis usually less than the width of an eye along hind margin as seen from above 6
6 (5). Males 7
Females 10
7 (6). The apices of clavi not reaching a line produced through the costal margins of the two hemelytra at the nodal furrows.......... 8
The apices of clavi reaching or exceeding a line produced through the margins of the two hemelytra at the nodal furrows.......... 20

8 (7). With not more than five yellow lines separating the black transverse bands on pronotum; row of pegs on pala almost straight and parallel to the inner margin of palm (see fig. 56).................. *T. minima* (Abbott) (p. 332)

With six or more yellow lines separating the black transverse bands on the pronotum; row of pegs on pala decidedly curved near apex and oblique *T. naias* (Kirkaldy) (p. 335)

9 (5). Length of pala equal to width of an eye along ventral margin..*T. beebei*, n. sp. (p. 306)

Length of pala usually less than two-thirds the width of an eye along ventral margin ....*T. reticulata* (G.-M.) (p. 343)

10 (6). With a very noticeable tuft of hair at apex of each clavus. *T. louisianae* Jaczewski (p. 321)

Without a tuft of hair at apex of each clavus, at most two or three setae .. 11

11 (10). Length of the apical area of embolar groove (pruinose area) exceeding length of middle tarsus ....*T. borealis*, n. sp. (p. 308)

Length of the apical area of the embolar groove less than the length of the middle tarsus 12

12 (11). Length of the polished area along costal margin of hemelytra anterior to nodal furrow equal to or less than the length of the middle tibia 17

Length of the polished area along costal margin of hemelytra anterior to nodal furrow greater than the length of the middle tibia 13

13 (12) Costal margin along at least the anterior half of the polished prenodal area of the embolar groove, thickened and impressed laterally to give effect of an oblique groove originating ventrally and progressing posteriorly to dorsal margin ....*T. orinocoensis*, n. sp. (p. 339)

Costal margin along polished prenodal area of the embolar groove flattened, bladelike, sometimes thickened or with rounded edge on anterior fourth ... 14

14 (13). Width of synthlipsis equal to width of an eye along hind margin as seen from above 15

Width of synthlipsis less than width of an eye along hind margin as seen from above 16

15 (14). Pronotum with no more than nine dark transverse bands, margins of prenodal polished area parallel, merging abruptly at anterior apex (southwestern United States) .... *T. uhleri*, n. sp. (p. 348)

Pronotum with 11 or more dark transverse bands, margins of prenodal polished area not parallel, costal margin curving inward gradually at anterior apex (southern Brazil and Argentina)............ *T. mendozana* Jaczewski (p. 330)

16 (13) Margins of polished prenodal area parallel or nearly so to apex, then costal margin abruptly emarginate (see fig. 191); venter of seventh segment with at least two patches of bristlelike setae on right side in region of spiracle (see fig. 87) ....*T. kanza*, n. sp. (p. 318)

Margins of polished prenodal area not parallel, costal marign gradually emarginate anteriorly (see fig. 192); venter of seventh segment with no more than a slightly longer pubescence on the right side around spiracle (see fig. 84).................................. *T. calva* (Say) (p. 310)

17 (12). Margins of polished prenodal area not parallel; costal margin curved inward gradually to anterior apex of area (see fig. 194).... ...*T. arizonensis*, n. sp. (p. 305)

Margins of polished prenodal area parallel at least posteriorly; costal margin obliquely emarginate at lateral apex of first abdominal segment (hemelytra in normal resting position)................................ 18

18 (17). Pruinose area of embolar groove appearing somewhat expanded anterior to costal emargination at expense of corium; costal margin immediately anterior to emargination appearing rolled upon itself (see fig. 186)
T. parvula (Champion)
(p. 341)

Pruinose area of embolar groove normal, vein Cu slightly and regularly curved; costal margin immediately anterior to emargination, thickened but not as above 19

19 (18). Venter of seventh abdominal segment with two patches of bristlelike setae on the right side, one anterior to the other, posterior to the spiracle, another patch posterior to left spiracle (see fig. 39) (Mexico)......*T. confusa*, n. sp.
(p. 316)

Venter of seventh abdominal segment showing only a single patch of longer silky hairs surrounding right spiracle (see fig. 86)...........*T. verticalis* (Fieber)
(p. 350)

20 (7). Left posterior lobe of abdomen with the lateral anterior angle produced to form a lobe, causing the lateral margin to appear concave at some region along distance to apex 21

Left posterior lobe of abdomen with the lateral margin convex, often expanded from anterior lateral angle to apex.................................... 23

21 (20). Expansion of anterior lateral angle of left posterior lobe large, including anterior half of lateral margin; apex of posterior left lobe narrowly truncate (see fig. 43) ....*T. orinocoensis*, n. sp.
(p. 339)

Expansion of anterior lateral angle of left posterior lobe small, including not more than the anterior third; apex of left posterior lobe not narrowly truncate, similar to the right. 22

22 (21). Pala as long as total length of tibia; dorsal margin of pala appearing flattened or slightly concave (see fig. 42) (South America)... *T. mendozana* Jaczewski
(p 330)

Pala less than total length of tibia, dorsal margin regularly rounded (see fig 64) (North America) ....*T* *verticalis* (Fieber)
(p. 350)

23 (20). Strigil straight, the left tergal lobe of the sixth abdominal segment angulate laterally (see fig. 67).. 24

Strigil curved along apical and to a greater or lesser extent along the lateral margin of the left tergal lobe of the sixth abdominal segment.............. 25

24 (23). Median tergal lobe of seventh segment distinctly angulate at apex (see fig 28).
T *confusa*, n sp.
(p. 316)

Median tergal lobe of seventh segment rounded at apex (see fig. 24).
T. parvula (Champion)
(p. 341)

25 (23). Strigil appearing as little more than a heavy dark line along lateral margin of the left tergal lobe of the sixth abdominal segment, and usually curved abruptly upward at the medial apex (see fig. 32)...........*T. calva* (Say)
(p. 310)

Strigil normal, showing definite transverse comblike rows of teeth 26

26 (25). Anterior and posterior margins of strigil parallel or nearly so (see fig. 12) . . 27

Anterior and posterior margins of strigil not parallel, with one portion noticeably thicker than the remainder.................................... 29

27 (26). Width of the synthlipsis equal to the width of an eye along hind margin as seen from above.....................................*T. arizonensis*, n. sp.
(p. 305)

Width of the synthlipsis noticeably less than the length of an eye along hind margin as seen from above.. 28

28 (27). Pala with dorsal margin angulate, pegs arranged in shape of inverted V (see fig. 11) ....*T. kanza*, n. sp.
(p. 318)

Pala with dorsal margin regularly rounded pegs arranged in a curved row (see fig. 18)...*T. uhleri*, n. sp.
(p. 348)

29 (26). Strigil noticeably widened in medial (relative to dorsum) half (see fig. 4), vertex projected beyond the anterior margin of the eyes by one-third their medial length as seen from above............ ....*T. borealis*, n sp. (p 308)

Strigil noticeably widened in lateral (relative to dorsum) half (see fig 5), vertex rounded in front of eyes, not projecting one-third their medial length as seen from above ....*T. louisianae* Jaczewski (p. 321)

DESCRIPTION OF SPECIES*

1. *Trichocorixa arizonensis*, n. sp.

(Plate XLVIII, figs. 17-20; plate LII, fig. 93; plate LV, fig. 155; plate LIX, fig 194; plate LXIII)

Size.—Males, length 2.4 mm.-3.6 mm.; females, 3.4 mm.-3.8 mm.

Color and sculpture.—Pattern of hemelytra coarsely reticulose, oblique lines usually complete at inner basal angle of clavus; basal fourth of costal margin darkened; hemelytra smooth and polished throughout; pronotal disk with about seven to eight transverse dark lines (see fig. 155), sometimes broken; anterior fourth in both male and female usually noticeably rugose; vertex yellowish throughout; venter and legs yellowish.

Structural characteristics of male.—Head: Width of synthlipsis to hind margin of eye as 2.3 : 3.2†; vertex but slightly projected; frontal fovea broadly oval, shallowly concave (see fig. 93) with a few scattered long hairs. Width of pronotal disk to length as 7.0 : 4.0; prothoracic lateral lobe with anterior apical angle acute. Clavi with apices not reaching a line produced through the costal margins of hemelytra at the nodal furrows. Pala as in figure 20. Ratio of lengths of femur, tibia, and pala of foreleg, 2.6 : 2.0 : 1.6; middle leg—femur, tibia, tarsus and claws, 9.3 : 4.8 : 4.2 : 4.25.

Dorsum of abdomen as shown in figure 17. Right clasper as in figure 19; left clasper as in figure 18.

Structural characteristics of female.—Head: Width of synthlipsis to length of hind margin of eye as 2.6 : 3.3. Width of pronotal disk to length as 7.6 : 4.4; prothoracic lateral lobe with anterior apical angle acute.

Hemelytra (see fig. 194) with length of apical pruinose area of embolar groove equal to length of nodal furrow; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows (see fig. 179p) to length of clavus along inner margin as 2.0 : 9.0. Apical third of clavus and apical half of corium with scattered short spinose setae, usually with a group on disk of corium laterad from apex of clavus, slightly longer and more noticeable; no evidence of long hairlike setae.

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* Arranged alphabetically; for systematic treatment of genus see page 303.

† Unit of 1.0 = .14 mm

Second segment of abdomen acutely produced posterolaterally, and when wings are resting normally, usually appearing barblike just anterior to polished portion of costal margin. Venter of sixth segment deeply concave medially; venter of seventh segment produced medially slightly beyond apices of laterotergites, truncate medially; both shape of sclerites and arrangement of pubescent patches symmetrical.

Holotype.—Male, Cochise County, Ariz., July 29, 1927 (R. H. Beamer) [in the Francis Huntington Snow Entomological Collections].

Allotype.—Female, as above.

Paratypes.—92 males and 118 females, as above.

Variations within species.—Little can be said concerning range of variation according to geographical distribution, since only two localities are recorded; however, the form from Phoenix appears considerably larger than that from Cochise County, the female measuring 4.4 mm., the male 3.8 mm.; because of this size variation, the Phoenix specimens were not made paratypes, although structurally they appear identical to the typical form.

Comparative notes.—This species appears most closely related to *T. kanza*, n. sp., and to *T. uhleri*, n. sp., from which it may be separated as noted in key. It is very likely that this species is the southwestern representative of the same stock from which *T. kanza* originated.

Distribution.—See Plate LXIII, figure 211. Cochise County, Ariz., July 29, 1927 (R. H. Beamer); Phoenix, Ariz. (Bueno)—Francis Huntington Snow Entomological Collections.

2. *Trichocorixa beebei*, n. sp.

(Plate L, figs 48-51; plate LV, fig. 163; plate LIX, fig. 193, plate LXI)

Size.—Males, length 3.0 mm.; females, length 3.2 mm.

Color and sculpture.—Pattern of hemelytra coarsely reticulose, with noticeable tendency toward irregular transverse lines on apical half; basal portion of costal margin slightly darkened; hemelytra smooth throughout; pronotal disk with about 9 to 12 dark lines, somewhat more narrow than intervening yellowish line, often noticeably broken; anterior portion somewhat roughened, rugose on anterior margin; vertex yellowish throughout, but bearing numerous very fine dark punctures, particularly evident in female; venter yellowish throughout; apex of pala, apical fifth of middle tarsus, apical fourth of first segment of hind tarsus, and basal two-thirds of second, lightly infuscated.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 3.0 : 2.0; as seen from above, vertex projecting beyond eyes a distance equal to one-half the length of the hind margin of an eye; frontal fovea broadly oval, but not reaching laterally to the margin of the eyes, distinctly concave beneath vertex, more flattened toward rostrum, rather densely covered with long hairs. Width of pronotal disk to length as 6.3 : 3.8; prothoracic lateral lobe long, narrowly rounded at apex. Clavi with apices that just reach a line produced through the costal margins of hemelytra at the nodal furrows. Pala as in figure 49. Ratio of lengths of femur, tibia and pala of foreleg, 2.75 : 2.5 : 3.0; middle leg—femur, tiba, tarsus and claws, 9.25 : 4.6 : 3.5 : 3.75.

Dorsum of abdomen as shown in figure 48. Right clasper as in figure 45; left clasper as in figure 46.

Structural characteristics of female: Head: Width of synthlipsis to length of hind margin of eye as 3.6 : 2.2. Width of pronotal disk to length as 4.0 : 4.25; prothoracic lateral lobe long, narrowly rounded at apex.

Hemelytra without apical pruinose area of embolar groove; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus along inner margin as .75 : 9.0. Apical half of clavus, and of corium with scattered short spinose setae, those at apex of clavus two or three times the length of the remainder; no evidence of long hairlike setae.

Second segment of abdomen acute at lateral apex, but not produced beyond lateral margin of succeeding segment. Venter of sixth segment but slightly concave medially, shape of sclerites and arrangement of pubescence symmetrical.

Holotype: Male, Tower Island, Galapagos; Arcturus Oceanographic Expedition, 1925 (Wm. Beebe, director), [in the Francis Huntington Snow Insect Collections].

Allotype: Female, as above.

Paratypes: 12 males, 66 females, as above.

Variation within species: Little variation other than in color marking is shown by the specimens at hand.

Comparative notes: This species is clearly derived from *T. reticulata,* but for some reason, probably associated with its extreme isolation, it has become specialized to a degree which clearly entitles it to specific rank. The most noticeable specialization is that of the pala, which appears inflated and is much larger than that of *T. reticulata.*

Distribution: See Plate LXI, figure 204. To date this species has been recorded only from Tower Island, the most northeasterly and most isolated of the Galapagos Archipelago.

3. *Trichocorixa borealis,* n. sp.

(Plate XLVII, figs. 1-4; plate LV, fig 151; plate LVIII, fig 190, plate LXIV)

Size: Males, length 4.0 mm.-4.4 mm.; females, length 4.2 mm.-4.6 mm.

Color and sculpture: Pattern of hemelytra so coarse as to be hardly reticulose, tending toward two irregular longitudinal lines on corium, oblique lines at inner basal angle of clavus weakened; costal margin infuscated along portion in contact with thorax; this may sometimes be limited to the extreme basal portion; nearly smooth, with some pebbly reflections. Pronotal disk with eight to nine transverse lines (see fig. 163), sometimes broken, usually about two-thirds the width of intervening yellowish areas; anterior half finely rugose, anterior margin distinctly so. Vertex in both sexes with the medial longitudinal line often infuscated. Venter and legs yellowish throughout.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 3.4 : 3.5; vertex projecting before eyes one-third the length of an eye along inner margin as seen from above; frontal fovea egg-shaped, somewhat truncate at rostral apex, reaches inferior angle of eyes laterally, long hairs sparse, fine pubescence on lower central portion. Width of pronotal disk to length as 8.5 : 5.5; prothoracic lateral lobe long, appearing slightly narrower in central portion than at apex, apex almost truncate. Apices of clavi slightly exceeding a line produced through the costal margins of hemelytra at nodal furrows, corium and apical portions of clavus showing numerous short spinose setae. Pala as in figure 1. Ratio of lengths of femur, tibia and pala of foreleg, 3.3 : 3.0 : 2.5; middle leg—femur, tibia, tarsus and claws, 12.85 : 6.0 : 4.0 : 5.5. Dorsum of abdomen as shown in figure 4. Right clasper as in figure 2; left clasper as in figure 3.

Structural characteristics of female: Head: Width of synthlipsis to length of hind margin of eye as 3.75 : 3.75. Width of pronotal disk to length as 9.0 : 6.0; prothoracic lateral lobe, broader than in male, appearing rectangular.

Hemelytra with length of apical pruinose area of embolar groove twice the length of nodal furrow; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus along inner margin as 1.5 : 11.5. Corium and apical third of clavus with numerous short, spinose setae; a few scattered long hairs also present in these areas.

Second segment of abdomen not produced laterally at apex beyond lateral margin of succeeding segment. Venter of sixth segment slightly concave medially; venter of seventh segment much more pronounced on right than on left side of abdomen.

Holotype: Male, Red Deer River, Manitoba, August 3, 1937 (H. T. Peters), in Francis Huntington Snow Entomological Collections.

Allotype: Female, as above.

Paratypes: 93 with data as above, and numerous additional paratypes from the following localities:

Manitoba: Cowan, August 7, 1937 (H. T. Peters).

Saskatchewan: Last Mt. Lake, May 18, 1939 (J. E. Moore); Redberry Lake, June 14, 1939 (J. E. Moore); Echo Lake, July 7, 1939 (J. E. Moore); Long Lake, June 14, 1938 (D. S. Rawson); Echo Lake, 1940 (D. S. Rawson).

Minnesota: Minneapolis, Mississippi River near University, April 18, 1922 (Wm. E. Hoffman); Minneapolis, Mississippi River, May 4, 1920 (R. F. Hussey); St. Paul, Como Park, July 20, 1921 (H. B. Hungerford); St. Paul, Phalen Lake, June 19, 1921 (H. B. Hungerford); St. Paul, July 16, 1932 (A. A. Granovsky); St. Paul, August 8, 1933, at light trap (A. A. Granovsky); Carlson, August 8, 1922 (H. B. Hungerford); Rochester, July 16, 1921 (H. B. Hungerford); Cooley, August 13, 1937 (C. L. Johnson).

North Dakota: Nelson County, Stump Lake, July 20, 1924 (T. H. Hubbell).

South Dakota: Pickerel Lake, September 14, 1939 (H. C. Severin); Lake Hendricks, July 12, 1922 (H. C. Severin); Lake Oakwood, June 14, 1923 (H. C. Severin); Brookings, April 29, 1923 (H. C. Severin); Wood, July 23, 1939 (H. C. Severin); Lake Traverse, September 13, 1939 (H. C. Severin); Clear Lake, 6 mi. northwest, August 11, 1939 (H. C. Severin).

Colorado: Pingree Park, August 20-25, 1923 (C. J. Drake); Weizenhorn Lake, October 6, 1913 (M. M. Ellis).

Iowa: Pickerel Lake, July 12, 1940 (D. D. Millspaugh).

Variation within species: This species appears to be of stable and homogeneous character throughout its range. The specimens from near Minneapolis, Minn., appear darker than those from most localities; however the pattern is not altered. The slight lateral accumination (females) at the basal apex of the shining portion of the costal margin varies considerably, but is nearly always noticeable.

Comparative notes: With the exception of *T. verticalis californica,* n. subsp., *T. borealis* is the largest representative of its genus in North America. It is difficult to assign a logical relationship to this species. In a number of characters it shows a quite generalized condition. The left posterior lobe, for instance, is probably the least specialized of any species in the genus. All factors considered, this species can probably be placed nearest *T. kanza,* n sp., and *T. louisianae* Jacz.

Distribution: See Plate LXIV. Localities in addition to those mentioned in the paratype series:

Northwest Territories: Great Slave Lake, June 3, 1945 (D. S. Rawson).

Manitoba: Selkirk, June 10, 1911 (J. B. Wallis).

Saskatchewan: Qu'appelle River, 1940 (D. S. Rawson).

South Dakota: Oak Lake, September 1, 1941 (G. B. Spawn); Waubay Refuge, June 4, 1942 (H. C. Severin); Waubay Refuge, alkali water, June 22, 1940; Kennebec, June 20, 1940, 2 miles west; Ortley, July 24, 1940 (H. C. Severin); Eureka, June 25, 1940; Kimball, June 11, 1940, 5 miles east; Plankington, June 11, 1940, 24 miles north; Lyman, July 11, 1940, 5 miles southwest; Lake Andes, June 14, 1940; Leota, July 24, 1940, 10 miles south; Oak Lake, August 7, 1940; Isabel, June 25, 1940 (H. C. Severin); Canton, gravel pit, 1 mile south, August 20, 1940 (G. B. Spawn).

4. *Trichocorixa calva* (Say), n. comb.

(Plate XLIX, figs. 29-32; plate L, fig. 84; plate LV, fig. 153; plate LVIII, fig. 192; plate LXIII)

1832. *Corixa calva* Say, Thomas. Description of New Species of Heteropterous Hemiptera of North America, p. 38, in Say's Entomology, Le Conte, vol. 1, p 366.

1851. *Corisa burmeisterii* Fieber, F. S. Species Generis Corisa, p 24, pl. II, fig. 2 [reprint]. NEW SYNONYMY.

1851. *Corixa burmeisteri,* Abbott, J. F. Bulletin Brooklyn Entomological Society, (n. ser.) vol. 8, p. 87. (Mention.)

1917 *Corixa burmeisterii,* Van Duzee, E P. Catalogue of Hemiptera of America North of Mexico . . . , p 486.

1926. *Corixa burmeisterii,* Blatchley, W. S. Heteroptera . . . of Eastern North America, p. 1086.

1931. *Trichocorixa burmeisterii,* Lundblad, O Zoologischer Anzeiger, Bd 96, Heft 3/4, pp 85, 87-89, 91; figs 1, 2, A-K. (A restudy of Fieber's types)

1948 *Trichocorixa* [sic] *verticalis,* Rau, P Entomological News, vol 54, No 10, pp 258-259. (This article was based on a mixed series containing some specimens of *calva*)

Size: Males, length 3.8 mm.-4.2 mm.; females, 4.2 mm.-4.6 mm.

Color and sculpture: Pattern of hemelytra coarsely reticulose, basal portion of clavus with pronounced oblique lines; slightly oblique, irregular lines tending to fuse on corium near apex of clavus and along lateroapical margin; portion of costal margin in contact with thorax lightly infuscated; hemelytra smooth throughout. Pronotal disk wth eight to nine dark transverse lines, sometimes broken (see fig. 153); pronotal disk smooth or nearly so throughout; vertex of females occasionally darker on median longitudinal line than elsewhere, otherwise with vertex, venter and appendages yellowish throughout.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 2.5 : 3.5; vertex strongly produced, projecting before the eyes one-fourth the length of the head as seen from above; frontal fovea elongate, reaching the eyes laterally, deeply concave, long setose hairs usually numerous on surface of fovea and frons. Width of pronotal disk to length as 8 0 : 5.5; prothoracic lateral lobe elongate, rounded apically. Clavi with apices slightly exceeding a line produced through the costal margins of hemelytra at the nodal furrows. Pala as in figure 29. Ratio of length of femur, tibia and pala of foreleg, 3.5 : 2.75 : 2.0; middle leg—femur, tibia, tarsus and claws, 12.0 : 5.5 : 3.8 : 4.5.

Dorsum of abdomen as shown in figure 32. Right clasper as in figure 30; left clasper as in figure 31.

Structural characteristics of female: Head: Width of synthlipsis to length of hind margin of eye as 2.6 : 4.0. Width of pronotal disk to length as 8.0 : 5.0; prothoracic lateral lobe moderately broad, usually appearing somewhat truncate apically.

Hemelytra (see fig. 192) with length of apical pruinose area of embolar groove slightly exceeding length of nodal furrow; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrow to length of clavus along inner margin as 2.0 : 11.0. Short spinose setae noticeable along inner marginal area of apical half of clavus, otherwise hemelytra showing few of either long hairs or short spinose setae.

Second segment of abdomen not produced laterally at the apex beyond the lateral margin of the succeeding segment. Venter of sixth segment (see fig. 84) with hind margin appearing slightly biconcave medially; right lobe of hind margin larger than left; venter of seventh segment produced medially a fourth of its length beyond apices of lateral tergites, narrowly rounded apically; pubescent patches somewhat heavier on the right than on the left side; abdomen usually appearing somewhat thicker on the left side than on the right.

Neotype: Male, Havana, Ill., July 11, 1896 (Hart), in Francis Huntington Snow Entomological Collections.

Variation within species: T. calva is quite uniform in color and structure throughout its range. It does show considerable range in size. In general it is found that the forms from the South are somewhat smaller than those from the more northern portion of its range.

Comparative notes: The structures of the females seem to indicate a fairly close relationship with *T. kanza;* the males, however, show a number of highly specialized secondary sexual characteristics which complicate the matter. Despite this it appears that *T. calva* is more closely related to *T. kanza* than to any other representative of the genus.

Nomenclatorial notes: In 1832 (34, p. 366) Thomas Say described a species which he called *Corixa calva.* His original description is as follows:

"Thorax eight- or nine-lined; lines of the hemelytra subequal.

"Inhabits United States.

"Body above glabrous, polished, pale yellowish, with transverse black lines; head immaculate, the posterior angles distinct; thorax with eight or nine black transverse lines; hemelytra with numerous, undulated black transverse lines more or less bifid and inosculated; those of the anterior inner portion not larger than the others; lateral grooves and all beneath yellowish white.

"Length less than one-fifth of an inch.

"Quite distinct from the *interrupta* and *alternata* nob., which are both minutely rugulose."

It is readily seen from his illustrations that Fieber in 1851 (7, p. 19) did not recognize Say's species *calva.* Say's description, however, is unquestionably that of a *Trichocorixa.* The size, number of lines on the pronotum, polished dorsum, and color pattern of the hemelytra all support this conclusion. Granting that *calva* is a

Trichocorixa, there are only three species which fit Say's description and which might be taken in the region of New Harmony, Ind.—*T. burmeisterii* (Fieber), *T. verticalis* (Fieber), and *T. kanza,* n. sp. Of these three species, *T. verticalis* (Fieber) is exceedingly rare in the central portion of the Mississippi River basin. In fact there are no records for this species from Indiana or neighboring states. It also appears that *T. kanza,* n. sp., approaches the eastern boundary of its range in this region and is also probably rare, although additional collecting data may prove otherwise; *T. burmeisterii* (Fieber), however, is probably one of the most common corixids to be found in eastern North America. All three species fit Say's description from the standpoint of color; however, if it is assumed that by "distinct" Say meant acute, the males of *T. burmeisterii* (Fieber) most nearly fit the statement, "the posterior angles distinct (head)."

Therefore, it appears that on the basis of this evidence, *T. burmeisterii* (Fieber) 1851 must be considered a synonym of *T. calva* (Say) 1832. Since the types of Say's *calva* are not extant, the neotype already noted has been established.

Distribution: See Plate LXIII. *New York:* Cold Springs Harbor, Long Island, July 26, 1920 (Priscilla Butler); Queens Village, Long Island, September 25, 1937 (John Lutz); Bay Side, Long Island, August 7, 1941 (John Lutz); V. Cortlandt Park, April 25, 1903.

New Jersey: Fort Lee, October 3, 1914; Rancoca, August 30, 1927; Trenton, July 6; Silt Meadows, Newark, August 28; Palisades, September 7.

Pennsylvania: Highspire, September 25; Philadelphia Neck, May 29, 1898 (W. J. Gerhard); Tullytown, August 24, 1913 (H. W. Fowler); Stoney Run, November 1883 (Uhler Collection); Delaware County, July 1, 1941 (John Lutz); Chamounix Lake, Philadelphia, June 14, 1941 (John Lutz); Bristol, September 4, 1937 (John Lutz).

Maryland: Beltsville, September 25, 1932 (P. W. Oman); South River, 4 miles south Annapolis, July 31, 1932 (P. W. Oman); Plummers Island, August 15, 1913; Glen Echo, July 26, 1894; Bladensburg, September 11, 1892.

Virginia: Norfolk, July 4, 1931 (Geo. E. Gould); Vienna, September 19, 1931 (P. W. Oman); New Church, July 15, 1934 (L. D. Anderson); Lake Drummond, September 10, 1933 (L. D. Anderson).

North Carolina: Raleigh, September 15, 1915 (R. W. Leiby).

Georgia: Wrens, August 22, 1930 (P. W. Oman); Baker County, December 23, 1946 (L. W. Morgan); Thalman, April 28, 1911; Macon, July 25, 1930 (P. W. Oman); Gainesville, April 20, 1911; Decatur County; Marietta, March 5, 1911; Perry, August 12, 1939 (J. D. Beamer); Tifton, August 11, 1939 (D. E. Hardy); Athens, March 8, 1911.

Florida: Gainesville, July 4, 1918 (C. J. Drake); Charlotte Harbor (Mrs. A. P. Slosson); Hilliard, July 28, 1934 (R. H. Beamer).

Alabama: Coatopa, July 18, 1930 (P. W. Oman); Crawford, July 24, 1930 (R. H. Beamer); Marion Junction, July 15, 1930 (R. H. Beamer); Tuskegee, July 22, 1930 (P. W. Oman); Montgomery, July 7, 1939 (P. B. Lawson); Decatur, July 6, 1939 (P. B. Lawson); Mobile, August 30, 1910 (H. P. Löding); Mt. Meigs, July 21, 1930 (R. H. Beamer); Beulah Bay, Wheeler Lake, Decatur, August 29, 1939 (Hess); Barren Fork, Wheeler Lake, Decatur, August 29, 1939 (Hess); Leroy, June 11, 1917 (Shannon).

Tennessee: Elkton, July 6, 1939 (P. B. Lawson); Clarksville, July 16, 1939 (E. G. Wegenek).

Mississippi: Leland, September 14, 1921; Fayette, July 23, 1921; Beaumont, April 19, 1932 (H. Dietrich); Port Gibson, July 22, 1921; Columbus, July 16, 1930 (R. H. Beamer); Lauderdale, July 17, 1930 (P. W. Oman); Ireland, July 8, 1934 (R. H. Beamer); Hamilton, July 15, 1930 (L. D. Tuthill); Fulton, July 14, 1930 (R. H. Beamer); Waveland, July 9, 1934 (P. McKinstry); Lucedale, July 2, 1930 (H. Dietrich).

Louisiana: Madison Parish, July 7, 1930 (R. W. Bunn); Opolousas (Pilate) [U. S. N. M.]; Natchitoches Parish, August 16, 1928 (L. D. Beamer); Red River Parish, August 17, 1928 (E. I. Beamer); Calcasieu Parish, August 17, 1928 (R. H. Beamer); Baton Rouge, March 9, 1939 (R. M. DeCoursey); Caddo Parish, August 19, 1928 (L. D. Beamer); Mound, July 5, 1918 (J. C. Bradley); Beauregard Parish, August 13, 1928 (E. I. Beamer); Gueydan, August, 1922 (E. R. Kalmbach); Sabine River Ferry, June 20, 1917.

Texas: College Station, June 23, 1938 (R. H. Beamer); Jefferson, June 22, 1938 (R. H. Beamer); Brownsville, March 5, 1904 (H. S. Barber); Colorado County, April 7, 1923 (Mrs. Grace Wiley); Dallas County, December 1, 1938 (D. D. Millspaugh); Athens, December 5, 1938 (D. D. Millspaugh); Beasley, November 7, 1932 (L. D. Tuthill); Bowie County, August 20, 1928 (R. H. Beamer);

Orange County, August 14, 1928 (R. H. Beamer); Cedar Lane, August 9, 1928 (R. H. Beamer); Devers, June 21, 1917; Bowie County, August 16, 1928 (E. I. Beamer); Brooks County, July 25, 1928 (R. H. Beamer); Wood County, February 5, 1938 (D. D. Millspaugh); Peeler, June 22, 1938 (D. W. Craik); Sequin, June 26, 1938 (R. I. Sailer).

Arizona: Sabino Canyon, December 20, 1941 (H. B. Hungerford).

Arkansas: Polk County, August 21, 1928 (R. H. Beamer); Lawrence County, June 28, 1927 (Byron Marshall); Scott County, August 23, 1928 (R. H. Beamer); Berrytown, August 4, 1934 (R. H. Beamer); Fayetteville, 1938 (M. W. Sanderson); Hope, April, 1931 (Knoled).

Oklahoma: Ketchum, October 11, 1932 (L. D. Tuthill); Grove, October 2, 1932 (L. D. Tuthill); Tulsa County, March 16, 1923 (Mrs. Grace Wiley).

Kansas: Douglas County, September 24, 1921 (Robert Guntert); Morton County, August 20, 1924 (C. O. Bare); Leavenworth County, August 12, 1924 (E. P. Breakey); Cherokee County, December 1922 (R. H. Beamer); Hodgeman County, July 17-25, 1917; Decatur County, July 6, 1926 (R. H. Beamer); Scott County, June 25, 1925 (R. H. Beamer); Rice County, July 3, 1923 (L. C. Woodruff); Butler County, 1916 (R. H. Beamer); Sedgwick County, 1916 (R. H. Beamer); Osage County, June 15, 1923 (R. H. Beamer); Kiowa County, July, 1923 (L. C. Woodruff); Kingman County, 1916 (R. H. Beamer); Harper County, 1916 (R. H. Beamer); Medora, July 2, 1927 (R. H. Beamer); Coldwater, June 19, 1927 (R. H. Beamer).

Missouri: St. Louis, May, 1911 (J. F. Abbott).

Nebraska: Lincoln, October 1, 1898 (Hart); Lincoln, salt basin, November 12, 1923 (O. Bryant).

South Dakota: Tyndall, September 5, 1940 (H. C. Severin); Herrick Dam, September 5, 1940 (H. C. Severin); Field Pond, Pine Ridge, September 6, 1940 (G. B. Spawn).

Minnesota: Rochester, July 16, 1921 (H. B. Hungerford).

Wisconsin: Madison, September 4, 1914 (J. G. Sanders); Dane County, August 27, 1916 (Wm. S. Marshall).

Iowa: Ames, July 29, 1924 (C. J. Drake); Mt. Pleasant, March 21, 1939 (J. Russell); Burlington (H. G. Griffith); Bremer County, July 6, 1940 (Iowa Insect Survey); Butler County, July 6, 1940 (Iowa Insect Survey).

· *Illinois:* Homer, April 27, 1907; Belvidere, May 4, 1926; Ogle County, Ill. [U. S. N. M.]; Glen Ellyn, October 11, 1903 (W. J. Gerhard); Muncie, April 20, 1904; Olive Branch, September 5, 1923 (Owen Bryant); Riverside, August 30, 1920 (Priscilla Butler); Algonquin, November 3, 1908 (Nason); Urbana, October 8, 1908; Savanna, July 26, 1892 (Hart and Forbes); Parker, July 13, 1909; Havana, various dates (collected by Hart, Newberry, Hempel and Kofoid); Urbana, October 1, 1898 (Woodworth); Havana, July 11, 1896, and July 6, 1894 (Hart).

Michigan: Ann Arbor, June 17, 1921 (R. F. Hussey).

Indiana: Kosciusko County, July 5, 1932 (Geo. E. Gould); Marion County, October 4, 1924 (W. S. B.); Columbia City, September 18, 1894.

Ohio: Columbus, September 4, 1915 (C. J. Drake); Hocking County, July 7, 1916 (C. J. Drake); Tiffin, August 26, 1916 (C. J. Drake); Mirror Lake, Columbus, July 26, 1919 (W. C. Kraatz).

District of Columbia: Washington, 11 miles northeast, October 2, 1932 (P. W. Oman).

5. *Trichocorixa confusa*, n. sp.

(Plate XLVIII, figs 25-28, plate LII, figs 89, 91, plate LV, fig 161, plate LVIII, fig 185, plate LXIV)

Size: Males, length 3.6 mm.; females, 4.0 mm.

Color and sculpture: Pattern of hemelytra in male reticulose; oblique lines on base of clavus usually complete though narrowed towards inner basal angle. Pattern of hemelytra in the female showing a definite tendency for the dark lines to be transverse with considerable reticulation, small darkened areas on the corium at its apex and at the apex of the clavus; oblique lines on base of clavus obsolete towards inner angle, lines on clavus broken on median discal portion to form a clear spot; hemelytra smooth and polished throughout. Pronotal disk with 9 to 10 dark transverse lines (see fig. 161), often broken, smooth and polished in both sexes. Vertex, costal margin along thorax, venter and appendages yellowish throughout.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 2.8 : 3.5; vertex noticeably projected (see fig. 91); frontal fovea elongate, oblong, lateral margins reaching inner margin of eyes, deeply concave, with numerous long setose hairs. Width of pronotal disk to length as 7.75 : 5.0; prothoracic lateral lobe moderately long, narrowed toward apex, anterior apical angle inferior. Clavi with apices exceeding a line drawn through the costal margins of hemelytra at the nodal furrows. Pala as in figure 27. Ratio of length of femur, tibia and pala of foreleg as 3.0 : 2.6 : 1.7; middle leg—femur, tibia, tarsus and claws as 10.0 : 4.0 : 3.0 : 4.0.

Dorsum of abdomen as shown in figure 28. Right clasper as in figure 25; left clasper as in figure 26.

Structural characteristics of female: Head: Width of synthlipsis to hind margin of eye as 3.0 : 3.6. Width of pronotal disk to length as 8.0 : 5.3; prothoracic lateral lobe moderately broad, anterior apical angle somewhat inferior.

Hemelytra (see fig. 185) with length of apical pruinose area of embolar groove twice the length of the nodal furrow. Ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus, along inner margin as 1.5 : 11.5. Apical third of clavus and apical half of corium with scattered short spinose setae, no evidence of long hairlike setae.

Second segment of the abdomen acutely produced laterally along lateral margin of succeeding segment. This process is densely covered with a short pubescence, and (wing in normal resting position) can be seen from above just in front of polished portion of the costal margin. Venter of fifth, sixth, seventh and eighth segments of the abdomen as in figure 89.

Holotype: Male, Nainari, Sonora, México, August 19, 1927 (A. Dampf), at light in house of Gen. A. Obregón; in the Francis Huntington Snow Entomological Collections.

Allotype: Female, as above.

Paratypes: 110 males and 135 females, as above.

Variation: Little can be said concerning variation since all specimens are from one locality; however, it may be noted that in contrast to *T. parvula* (Champ.) the shape of the claspers is stable.

Comparative notes: This species is very close to *T. parvula* (Champ.), separable from that form as noted in the key. There are a few other structures which would appear to assist in the determination of these species. The vertex of *T. parvula* appears less prominently projected (see figs. 90 and 91). The pronotum bears a larger number of transverse lines, and the hemelytra is more definitely reticulose in *T. parvula* than in *T. confusa.* The oblique lines at the base of clavus are never obsolete in the former as they are in the females of *T. confusa.* Nevertheless it is possible that the study of additional material from other localities, should it become available, will show *T. confusa* to be a subspecies of *T. parvula*.

Distribution: See Plate LXIII. As given above in data for type material.

6. *Trichocorixa kanza*, n. sp.

(Plate XLVII, figs 9-12; plate LII, fig. 87; plate LV, fig. 152; plate LVIII, fig. 191, plate LXIV)

1943 *Tricocorixa* [sic] *verticalis*, Rau, P. Entomological News, vol 54, No. 10, pp 258-259 (This article was based on a mixed series of which *kanza* comprised the larger portion)

Size: Male, length 4.2 mm.-4.5 mm.; female, 4.3 mm.-4.5 mm.

Color and sculpture: Pattern of hemelytra coarsely reticulose, tending toward a transverse arrangement of markings, particularly on the clavus; the oblique lines at the inner basal angle of the latter structure are complete, though narrowed inwardly. Hemelytra smooth and polished throughout; pronotal disk (see fig. 152) with eight to nine transverse lines, usually narrower than intervening stramineous areas, lines frequently split or broken; anterior third in females slightly roughened, remainder nearly smooth, polished throughout; males smooth and polished throughout. Vertex, venter and legs stramineous throughout.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 3.0 : 3.5; vertex not projecting beyond the eyes more than a fifth the length of the head as seen from above; frontal fovea ovate, shallowly concave, reaching to the inner margin of the eyes laterally, with scattered long hairlike setae. Width of pronotal disk to length as 8.0 to 5.8; prothoracic lateral lobe over half as wide at middle as long, rounded at apex. Clavi with apices reaching a line produced through the costal margins of hemelytra at the nodal furrows. Pala as in figure 11. Ratio of lengths of femur, tibia and pala of foreleg, 3.6 : 3.0 : 2.3; middle leg—femur, tibia, tarsus and claws, 11.8 : 5.8 : 3.75 : 4.5.

Dorsum of abdomen as shown in figure 12. Right clasper as in figure 9; left clasper as in figure 10.

Structural characteristics of female: Head: Width of synthlipsis to length of hind margin of eye as 3.35 : 4.00. Width of pronotal disk to length as 3.5 : 6.0; prothoracic lateral lobe broad, anterior angle of apex inferior to posterior angle.

Hemelytra (see fig. 191) with length of apical pruinose portion of embolar groove twice the length of the nodal furrow; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus along inner margin as

2.5 : 10.5. Clavus usually with scattered short spinose setae and a few long hairlike setae along inner margin, the former more noticeable along apical portion; apical half of corium with scattered short spinose setae and a few long hairlike setae.

Second segment of the abdomen not produced apically beyond lateral margin of succeeding segment. Venter of the sixth segment with the hind margin regularly but shallowly concave; right lobe of hind margin larger than left; venter of seventh segment produced noticeably beyond apices of laterotergites, truncate medially at apex. The shape of the sclerites is symmetrical; however, the right side of the venter of the seventh segment shows two well pronounced patches of bristlelike hairs (see fig. 87).

Holotype: Male, Doniphan County, Kan., July 20, 1924 (R. H. Beamer); in the Francis Huntington Snow Entomological Collections.

Allotype: Female, same as above.

Paratypes: 127 males, 87 females, as above; 13 males and 47 females, Doniphan County, Kan., August 21, 22, 23, 24, 1921 (Robert Guntert); also in the Francis Huntington Snow Entomological Collections.

Variation within species: This species is very uniform throughout its range.

Comparative notes: *T. uhleri*, *T. arizonensis* and *T. louisianae* are closely related to *T. kanza*. Superficially the female of *T. calva* is easily confused with that of *T. kanza*, for they are of approximately the same size and color, and the characteristic costal margin of the latter shows enough variation to resemble *T. calva* occasionally; however, the asymmetry (*kanza*) or symmetry (*calva*) of the arrangement of the pubescence on the venter of the seventh segment of the abdomen is the character to which final recourse should always be taken in determining the females of these two species. The female of *T. louisianae* shows an asymmetric arrangement similar to that of *T. kanza*, but may be distinguished as in the key.

Distribution: See Plate LXIV. In addition to data for type material: *Kansas:* Douglas County, August 28, 1928 (P. B. Lawson), light trap; Onaga, July 7, 1925 (R. H. Beamer); Atchison County, July 17, 1924 (R. H. Beamer); Woodson County, July 3, 1923 (Beamer and Lawson); Harper County, 1916 (R. H. Beamer); Manhattan, September 13, 1923 (H. B. Hungerford); Cherokee County, August 16, 1920 (Hungerford and Beamer).

Missouri: St. Louis, September, 1911 (J. F. Abbott).

Arkansas: Polk County, August 21, 1928 (R. H. Beamer); Eureka Springs, July 4, 1934 (R. H. Beamer); Lawrence County, June 28, 1927 (Byron Marshall); Readland, July 7, 1930 (M. E. Griffith).

Oklahoma: Stroud, August 10, 1941 (R. H. Beamer); Ardmore, April 14, 1923 (H. B. Hungerford); Tulsa County, March 16, 1922 (Grace O. Wiley).

Texas: San Juan, June 28, 1938 (L. W. Hepner); College Station, June 23, 1938 (L. W. Hepner); Brownsville, June 30, 1938 (R. I. Sailer); Progreso, July 2, 1938 (R. I. Sailer); Jefferson, June 21, 1938 (R. H. Beamer); Cedar Lane, August 9, 1928 (R. H. Beamer); Bowie County, August 20, 1928 (R. H. Beamer); Brazoria County, August 12, 1938 (L. D. Beamer); Victoria, September 22, 1914 (J. D. Mitchell); Alfred, July 24, 1928 (R. H. Beamer); Del Rio, July 8, 1938 (R. H. Beamer); Colorado County, April 5, 1921 (Mrs. Grace Wiley); Sequin, June 26, 1938 (R. H. Beamer); Palo Pinto County, July 14, 1928 (R. H. Beamer); Bowie County, August 16, 1928 (E. I. Beamer); Beasley, February 7, 1932 (L. D. Tuthill); Jackson County, August 9, 1928 (R. H. Beamer); Brooks County, July 25, 1928 (R. H. Beamer); Falfurrias, February 2, 1932 (L. D. Tuthill); Sinton, February 8, 1932 (L. D. Tuthill); Dallas County, January 20, 1939 (D. D. Millspaugh); Athens, December 5, 1938 (D. D. Millspaugh); Eastland County, May 25, 1921 (Mrs. Grace Wiley).

MEXICO: Granja Rodriguez, Nuevo Leon, June 6, 1921 (A. Dampf).

Louisiana: Madison Parish, July 7, 1930 (R. W. Bunn); Tallulah, August 15, 1929 (J. G. Shaw); Baton Rouge, March 9, 1929 (R. M. DeCoursey); Shreveport, June 29, 1891 (F. W. Malley); Calcasieu Parish, August 16, 1928 (A. M. James).

Mississippi: Ireland, July 8, 1934 (R. H. Beamer); Vicksburg, July 19, 1921 (C. J. Drake); Ocean Springs, August 2, 1921 (C. J. Drake); Woodville, July 26, 1921; Port Gibson, July 22, 1921.

Alabama: Montgomery, July 7, 1939 (P. B. Lawson).

Georgia: Baker County, December 23, 1946 (L. W. Morgan).

Tennessee: Elkton, July 6, 1939 (P. B. Lawson); Clarksville, July 19, 1939 (E. G. Wegenek).

Florida: Ponce de Leon, July 13, 1934 (M. E. Griffith).

District of Columbia: Washington (Bueno).

Pennsylvania: Philadelphia, August 10, 1929 (F. C. Lutz).

Illinois: Grand Tower, July 12, 1909; Urbana, April 16, 1892 (McElfresh); Roadhouse, June 11, 1892 (Titus); Charleston (Abbott); Roseville, August 22, 1941 (R. I. Sailer); Havana, December 23, 1895 (Hempel); Havana, April 10, 1895 (Hart and Newberry); Elizabethtown, August 10, 1898 (Hart).

Wisconsin: Madison, June 7, 1914 (J. G. Sanders).

Iowa: Sioux City, June 28, 1921 (C. N. Ainslee); Henry County, July 11, 1939 (D. D. Millspaugh); Linn County, May 11, 1932 (D. D. Millspaugh); Mt. Pleasant, March 22, 1928 (Zillmer); Wapello County, July 13, 1932 (Moore); Burlington (H. G. Griffith); Keokuk (Loewenstein).

Nebraska: Lincoln, July, collected at electric light.

7. *Trichocorixa louisianae* Jaczewski

(Plate XLVII, figs 5-8; plate LV, fig. 154; plate LVIII, figs 187-189, plate LXIII)

1914. *Arcticorixa reticulata,* Barber, H. G. Bulletin American Museum Natural History, vol. 33, p 497.

1926 *Corixa reticulata*, Blatchley, W S. Heteroptera of Eastern North America, p 1084

1931. *Trichocorixa louisianae* Jaczewski, T. Archiv fur Hydrobiologie, vol 23, pp 516-519, figs. 20-24.

Length: Male, 3.6 mm.-4.0 mm.; female, 4.0 mm.-4.6 mm.

Color and sculpture: Pattern of hemelytra reticulose, but usually showing definite tendency toward an undulant, transverse arrangement of markings; oblique lines at inner basal angle of clavus usually complete, though narrowed; costal margin usually infuscated; hemelytra smooth and polished throughout. Pronotal disk with seven to nine dark transverse bands which are usually much wider than intervening yellow lines, usually complete (see fig. 154); usually with feeble, scarcely perceptible rastrations in both sexes, tending to be more evident on anterior portion. Vertex usually infuscated along median longitudinal line and frequently with two additional infuscated lines, one along either side just in front of the margin of the eye. Venter and appendages stramineous, though in darkest forms, the thorax, particularly, somewhat darkened.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 2.25 : 3.5; vertex rounded in front of eyes; frontal fovea elongate oval, shallowly concave, reaching the margin of the eyes laterally, with a few scattered long hairs. Width of pronotal disk to length as 7.75 : 5.50; prothoracic lateral lobe slightly narrowed toward apex, the latter rounded with the anterior angle inferior. Clavi with apices barely exceeding a line produced through the costal margins of hemelytra at the nodal furrows. Pala as in figure 6. Ratio of lengths of femur, tibia and pala of foreleg, 3.2 : 2.4 : 2.3; middle leg—femur, tibia, tarsi and claws, 11.0 : 5.0 : 3.5 : 4.6.

Dorsum of abdomen as shown in figure 5. Right clasper as in figure 7; left clasper as in figure 8.

Structural characteristics of female: Head: Width of synthlipsis to length of hind margin of eye as 2.6 : 3.6. Width of pronotal disk to length as 8.0 : 5.2; prothoracic lobe moderately broad, slightly narrowed apically, broadly rounded apically.

Hemelytra (see fig. 187) with length of pruinose area of embolar groove equal to or slightly exceeding the length of nodal furrow; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus along inner margin as 1.5 : 12.0. Corium and clavus with numerous scattered short spinose setae, these usually more prominent on disk of former and apical portion of latter; the clavus also bears at its apex a group of three to seven short bristlelike hairs; hemelytra also bear a number of scattered long hairs (these are frequently rubbed off).

Second segment of the abdomen with posterolateral edge somewhat thickened and projected, but not forming an acute process extending over succeeding segment. Venter of sixth segment concave medially; venter of seventh segment produced medially, noticeably beyond apices of laterotergites, subtruncate medially; shape of sclerites symmetrical; arrangement of pubescence asymmetrical, with two prominent patches of bristlelike hairs on right side of venter of seventh segment; these patches but slightly if at all indicated on the left side.

Types: This species was described by Jaczewski from 38 specimens taken at New Orleans, U. S. A., May 26, 1905 (W. Schwinghammer). It is assumed that these types are located in the Polish Museum at Warsaw.

Variation within species: Four more or less well defined forms can be distinguished here. This variation does not seem sufficiently constant or clearly defined to justify subspecific names.

(A). Form common to western coast of Gulf of Mexico: Pattern of hemelytra with scarcely any evidence of transverse arrangement of markings. Dark markings noticeably narrower than intervening pale yellow areas; vertex usually entirely stramineous. Very similar in appearance to *T. kanza.* Size approximately that of typical form.

(B). Louisiana and southern Mississippi form: Typical for species.

(C). Florida and Georgia coast form: Smaller than the typical form; generally darker, dark markings wider than intervening yellow areas; vertex usually with three longitudinal infuscated lines.

(D). Cuban form: Characterized chiefly by the abrupt emargination of the costal margin of the hemelytra before the polished portion of the costal margin (see fig. 189). In the other forms this is oblique or rounded; here it is usually at almost a right angle. There also tends to be a fusion of the dark markings on the corium and clavus, forming solidly infuscated areas. The patches of hair on either side of the venter of the seventh abdominal segment are pronounced; however, on the right side the inner patch is elongate, running almost the full length of the sclerite, in contrast to the oval, more posteriorly placed patch of the typical form. *It should be pointed out that these are all characters common to the females.*

(E). Haitian form: Resembling Cuban form except that the costal emargination of the female is not so abrupt, the lateral hair patches on the venter of the seventh segment in the females appear fused, and the patch on the left side is nearly as large as that on the right in the specimens at hand.

(F). Puerto Rican form: Also similar to Cuban form, but with the costal emargination of the female not so abrupt and with the lateral hair patches on the venter of the seventh abdominal segment of the female divided, the inner one on the right side pronouced, on the left side suppressed, often not in evidence, but with the inner right patch ovate and placed near anterior margin of sclerite.

(G). Atlantic coastal form, North Carolina to New Hampshire: This form varies little from typical except in size, averaging considerably larger and more robust. It averages darker than all the forms except that from Florida. The pronotum of the female is frequently distinctly rastrate.

Nomenclatorial notes: Because of the very considerable variation found in this species, and the lack of opportunity to study its types, a translation, from the German, of the original description is given below.*

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* Bibliographic citation as under species, a free translation

Trichocorixa louisianae n. sp. New Orleans, U. S. A.

May 26, 1905, W. Schwinghammer

"This species stands very near *T. burmeisterii* (Fieber). The type specimens of the latter were last carefully studied and described by Dr. O. Lundblad.

"Body long elliptical. Ground color of pronotum and the hemelytra, head, underside of body and legs bright yellow, also the middle and hind tarsi are without dark coloring. The back of the abdomen of the male somewhat brownish.

"The head from the upper view somewhat more than half as long as the pronotum, in the male proportionately a little longer than in the female. Postocular space narrow. The facial impression of male large and broad, reaching upward about half the inner edge of the eyes and ending in a rounded line. Faces of both slightly marked. Neither is particularly thickly hirsute, somewhat thicker in the male than in the female. The frontal arch in the male somewhat produced forward; in the female it is a regular continuation completing the outline of the eyes. Fourth antennal segment short, length totaling 35.1 percent of the length of the third segment.

"Pronotum fairly long, its length totaling somewhat more than three-fifths its width. Posterior median angle very distinct. Side angles rounded anteriorly, posteriorly drawn to short, sharp point. On the fore margin is a scarcely noticeable keel-like elevation. Pronotum transversed by seven to nine foreshortened and anastomosing yellow lines. These vary much in width, so that they are sometimes wider and sometimes narrower than the intervening stripes of the ground color. Lateral lobes of the prothorax narrowed but little toward the apex, then rounded and somewhat angled.

"Pronotum with very feeble, scarcely perceptible rastrations. Hemelytra with indistinct, and feeble punctures, almost polished. Markings of the hemelytra ordinarily more numerous than in the related species of the genus *Trichocorixa* Kirkaldy. At the base of the clavus the clear lines are somewhat wider and more regular; otherwise they are hooked, angled, broken and anastomosed. The lines of the corium pass unbroken onto the membrane. Left membrane paler interiorly. Marginal area pale and the base and outside edge somewhat infuscated. Distal from the marginal area, the markings of the corium reach the other side of the hemelytra. Hemelytra showing two kinds of hairs; besides very short spine-like ones, are found fewer, longer very fine hairs. The bright markings of the hemelytra may soon narrow, or soon widen to become more evident than the dark ground color.

"Metasternal xiphus very short; almost semicircular.

"Foreleg of male: Trochanter with somewhat longer hairs in middle of arch. Femur with no area of thickened hairs or with small spines on anterior surface distal from basal hairy area. Tibia much expanded, apically produced over basal third of pala, the end of this projection with membranous fingerlike continuation. Pala somewhat half-oval, with inner edge almost straight and archlike on outer side. End of outer margin almost straight or often appearing even somewhat concave. Inner side with about 20, outer side with 9 long bristles. The single row of palar pegs begins near the base, arches feebly inward passing to the middle of the outer edge of pala, then turns down, following the border for considerable distance. The pegs near the apical end are somewhat larger. The last one, however, is again smaller. The number of pegs found on pala of six examined specimens were as follows: 13, 14, 14, 14, 16, 16. Foreleg of female with no particularly characteristic markings.

"Relative length of the various parts of the intermediate and hind legs, expressed in percentages of the length of the corresponding femur as follows:

	Femur	*Tibia*	*Tarsus*	*Claws*
Middle leg	100	47.1	30.4	43.1
Hind leg	100	91.9	101.6	48.3

"Claws of middle leg distinctly longer than the tarsi, shorter than the tibia. Noteworthy is the relative length of hind femora, whereby the proportions of the remaining leg parts appear noticeably short. On the upper side of the hind femora is a short row of about four small spines; about eight are on the underside, arranged in an elongate group.

"Strigil almost transversally bandlike with 22 to 24 irregular, divided and unbroken striae. Middle lobe of the seventh segment of the abdomen feebly developed, very little projected, bluntly rounded, without long hair or spines. Left genital clasper of hind lobe with a short prominent projection, from which the clasper gradually narrows to a rounded point at the end. Right genital clasper is likewise gradually narrowed toward apex. The hind continuation of the ninth abdominal segment without distinctive characteristics. Inner part of penis with a membranous expansion at end.

"Length: 3.75-4.25 mm.

"This species is distinguished from the other examined species of genus *Trichocorixa* Kirk. (as for instance *T. reticulata* G.-M.) by the larger size of the strigil.

"The following three, presumably related species, were taken in one catch, which were represented by examples in the following order: *T. reticulata* (G.-M.), 4 specimens; *T. verticalis* (Fieber), 5 specimens; *T. louisianae* n. sp., 36 specimens."

Distribution: See Plate LXIII. *Texas:* Cameron County, August 3, 1928 (J. G. Shaw); Sinton, November 8, 1932 (L. D. Tuthill); Jackson County, August 9, 1928 (R. H. Beamer); Hidalgo County, July 28, 1928 (J. G. Shaw); Falfurrias, November 2, 1932 (L. D. Tuthill); Colorado County, May 19, 1922 (Mrs. Grace Wiley); Alice, January 1, 1946 (L. D. Beamer); Victoria, Garcitas Creek, November 8, 1932 (L. D. Tuthill); McAllen, December 30, 1945 (L. D. Beamer); Brownsville, March 5, 1904 (H. S. Smith); Sequin, June 26, 1938 (R. I. Sailer); Beasley, November 7, 1932 (L. D. Tuthill); Cedar Lane, August 9, 1928 (R. H. Beamer); Beeville, Blanco Creek, November 8, 1932 (L. D. Tuthill); Orange County, August 14, 1928 (J. G. Shaw); Devers, June 21, 1917; Galveston, May (F. H. Snow).

MEXICO: Río San Francisco, Veracruz, August, 1932 (R. R. Soto); Isla Gulf, Costal Plain, Veracruz, June 8, 1937 (A. Dampf); Tanque de Malone La Babia, Coahuila, June 20, 1938 (R. H. Baker); Ciudad Carmen, Campeche, January 23, 1939 (A. Dampf); Matamoros, Tamaulipas, July 21, 1930 (A. Dampf); Balancán, Tabasco, January 2, 1939 (A. Dampf); Manatitlan, Veracruz, September 28, 1936 (H. D. Thomas).

Louisiana: New Orleans, June, 1915; Gueyden, August, 1922, at light (E. R. Kalmbach); Natchitoche Parish, August 16, 1928 (L. D. Beamer); Calcasieu Parish, August 16, 1928 (L. D. Beamer); Buras, salt marsh, October 30, 1937 (E. S. Hathaway).

Mississippi: Beaumont, April 19, 1932 (Dietrich); Bay St. Louis, July 9, 1934 (R. H. Beamer); Ocean Springs, August 2, 1921 (C. J. Drake).

Alabama: Theodore, June 12, 1917.

Florida: Archer, July 31, 1930 (R. H. Beamer); Punta Gorda, November 16, 1911; Pinellas County, January 7, 1927 (C. O. Bare); Orange County, January 11, 1938 (H. B. Hungerford); Likely, August 2, 1930 (R. H. Beamer); Sanford, August 8, 1939 (J. D. Beamer); Gainesville, December 14, 1937 (H. B. Hungerford); Plant City, June 20, 1926 (C. O. Bare); Ft. Myers, August 11, 1930

(R. H. Beamer); Dunedin, March 19, 1917; Wildwood, August 2, 1930 (R. H. Beamer); Estero, July 21, 1934 (P. McKinstry); Loughman, August 2, 1930 (P. W. Oman); Lakeland, May 9, 1912 (Wm. Davis); Wakulla Springs, July 14, 1934 (P. A. McKinstry); Cocoanut Grove, August 9, 1930 (R. H. Beamer); Tallahassee, July 14, 1934 (R. H. Beamer); Indian River; Lacoochee, August 9, 1939 (J. D. Beamer).

CUBA: Río San Juan, Pueblo Nuevo, Matanzas, June 18, 1932 (P. J. Bermudez); Río Canimar, Crossing Carretera, Central Matanzas, June 10, 1932 (J. J. Bermudez); Ojo de Agua, El Estero del Río Yumeri, Matanzas, June 18, 1932 (P. J. Bermudez); Cabanas, P. de H., September 5, 1913; Santiago de las Vegas, September 5, 1925 (S. C. Bruner).

HAITI: Manville, February 18, 1922.

PUERTO RICO: Cabo Rojo, April 4, 1937 (J. A. Ramos); Cartagena Lagoon, August 7, 1935 (J. G. Diaz).

Georgia: Thalman, April 25, 1911 (J. C. Bradley); Okefenokee Swp., July 25 (R. H. Beamer); Prattsburg, July 25, 1930 (L D. Tuthill); Baker County, December 23, 1946 (L. W. Morgan).

North Carolina: Beauford, brackish creek, June 11, 1911 (J. F. Abbott).

Virginia: Norfolk, July 4, 1931 (Geo. E. Gould); Lorton, August 4, 1946 (R. I. Sailer), marsh pools along Potomac.

Massachusetts: Nonamesset, August, 1911 (J. F. Abbott); Woods Hole, August, 1911 (J. F. Abbott).

New York: Cold Spring Harbor, Long Island, July 14, 1911 (H. M. Parshley).

New Hampshire: Hampton, April 23, 1922 (S. A. Shaw).

8. *Trichocorixa macroceps* (Kirkaldy)

(Plate L, figs. 52-55; plate LIII, figs. 112-116; plate LV, fig. 158; plate LVII, fig 181; plate LXIII)

1908. *Arctocorisa macroceps* Kirkaldy, G W. The Canadian Entomologist, vol. 40, pp. 118-119.

1913. *Corixa macroceps,* Abbott, J. F. Bulletin of the Brooklyn Entomological Society, vol. 8, p. 86. Describes female.

1917. *Corixa macroceps,* Van Duzee, E. P. Catalogue Hemiptera of America North of Mexico, p. 486.

1926 *Corixa macroceps,* Blatchley, W. S. Heteroptera of Eastern North America, pp. 1084-1085.

1926. *Trichocorixa micronectoides* Blatchley, W. S Heteroptera of Eastern North America, p. 1085. Cites manuscript name by Plunkett. New synonymy.

1928 *Corixa macrocerops,* Bueno, J. R. de la Torre-. List of the Insects of New York, N. Y. (Cornell) Agricultural Experiment Station Memoir 101, p. 142.

1931. *Trichocorixa macroceps,* Lundblad, O. Zoologischer Anzeiger, Bd 96, Heft 3/4, p. 92.

Length: Males, 2.8 mm.-3.1 mm.; females, 2.9 mm.-3.2 mm.

Color and sculpture: Pattern of hemelytra (see fig. 181) with markings tending to be fused into irregular longitudinal lineations, one along lateral margin of corium, one along inner margin of corium, and another along lateral margin of clavus; the membrane of the left hemelytron usually without markings, almost transparent; anterior portions of costal margin and of embolar groove infuscated; narrow inner margins of clavi yellow; markings on basal portion of clavus angulate and broken. Pronotal disk with at most three transverse dark lines, these frequently broken or obscured. Pronotum minutely rugose, sometimes appearing distinctly roughened; clavus and disk of corium also showing slight roughening. Pronotum, clavus and corium polished throughout. Vertex with an infuscated longitudinal line, otherwise stramineous. Venter and legs except apex of middle tarsi (infuscated) stramineous.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 2.5 : 3.0; vertex but slightly projected, rounded in front; frontal fovea obovate, scarcely reaching the eyes laterally, shallowly concave, and with scattered long hairs. Width of pronotal disk to length as 6.3 : 1.7 (see fig. 158); prothoracic lateral lobe moderately narrow elongate, anterior apical angle distinct. Portion of epimeron in contact with the prothoracic lobe noticeably inflated. Clavi with apices failing by about one-fourth their length along inner margin to reach a line produced through the hemelytra at the nodal furrows. The nodal furrow is situated just beyond the apex of the pruinose area of the embolar groove, and is very difficult to see. Hemelytra noticeably convex longitudinally as well as transversally, appearing somewhat inflated. Hind wings vestigial in all specimens at hand, Pala as in figure 52. Ratio of lengths of femur, tibia and pala of foreleg, 3.0 : 2.0 : 2.0; femur, tibia, tarsus and claws of middle leg, 8.3 : 4.3 : 3.3 : 3.0.

Dorsum of abdomen as shown in figure 55. Right clasper as in figure 53; left clasper as in figure 54.

Structural characteristics of female: Head: Width of synthlipsis to length of hind margin of an eye as 2.9 : 3.4; vertex rather sharply rounded in front of eyes. Width of pronotal disk to length as 6.0 : 1.5; prothoracic lateral lobe moderately elongate, with anterior apical angle acute. Portion of epimeron in contact with prothoracic lateral lobe noticeably inflated.

Hemelytra (see fig. 180) with the nodal furrow at the apex of the pruinose area of the embolar groove; ratio of distance from apices of clavi to line projected through costal margin at the nodal furrow to length of clavus along inner margin as 1.75 : 9.5. Hemelytra with no evidence of short spinose setae, but with numerous scattered hairlike setae on both clavus and corium.

Second segment of the abdomen joined at right angle to succeeding segment at lateral apex, grooved laterodorsally to receive costal margin of hemelytra. Venter of sixth segment slightly concave medially; venter of seventh segment not produced beyond apices of laterotergites, broadly rounded apically. Shape of sclerites and arrangement of pubescent patches symmetrical.

Types: Kirkaldy's type of this species was a female and is lost or no longer in existence. Abbott (1, 1913) described the male, designating it a *plesiotype.* This specimen is from Oglethorpe, Ga., July 10 (J. C. Bradley), and is now in the Cornell University Collection. This specimen would have been selected as the neotype, except that it is not the sex described by Kirkaldy.

Neotype: Female, Macon, Ga., July 25, 1939 (L. D. Tuthill).

Comparative notes: This species is readily distinguished from the other species of *Trichocorixa* by its very short pronotum and by the vestigial hind wings.

It appears to be most closely related to *T. minima* and *T. naias.*

Distribution: See Plate LXIII. As for neotype, and *Michigan:* Battle Creek, August 26, 1920.

New York: V Cortlandt Park, April 11, 1903; Cold Spring Harbor, Long Island, August 4, 1902; Staten Island, October 11, 1924, Clove Valley Pond (L. B. Woodruff).

New Hampshire: Hampton, April 14, 1922 (S. A. Shaw).

Virginia: Norfolk County, May 11, 1928 (G. E. Gould).

New Jersey: Lucaston, September 28, 1903.

North Carolina: Boardman, September 21, 1915 (R. W. Leiby).

South Carolina: Graniteville, October 25, 1930 (D. Dunavan).

Georgia: Okefeenoke Swamp, B. I., July 27, 1939 (R. H. Beamer); Macon, July 25, 1930 (P. W. Oman).

Mississippi: Columbia; Lucedale, June 8, 1920 (H. Dietrich).

Texas: Wood County, February 4, 1939 (D. D. Millspaugh).

Illinois: Foxlake, June 22, 1892 (Hart and Shiga).

9. *Trichocorixa mendozana* Jaczewski

Figures enumerated under subspecific names

(1) 1927. *Trichocorixa mendozana* Jaczewski, T. Annales Zoologici Musei Polonici Historiae Naturalis, vol. 6, pp. 258-260. Pl. VIII, figs. 17-20; pl. IX, figs. 21-27.

(2) 1928. *Trichocorixa mendozana*, Hungerford, H. B Bulletin of the Brooklyn Entomological Society, vol. 28, p. 174.

(3) 1931. *Trichocorixa mendozana*, Lundblad, O. Zoologischer Anzeiger, Bd. 96, Heft 3/4, pp. 90, 92.

(4) 1933. *Trichocorixa dar-pomorza* Jaczewski, T Annales Musei Zoologici Polonici Historiae Naturalis, vol. 10, No. 1, p. 3, pl. I, figs 1-5. NEW SYNONYMY. (Placed below as a subspecies of *mendozana*.)

Size: Males, 4.1 mm.-4.4 mm.; females, 4.3 mm.-4.6 mm.

Color and sculpture: Pattern of hemelytra (see fig. 183) coarsely reticulate, lines on base of clavus usually complete and more nearly transverse than oblique; basal portion of costal margin lightly infuscated; hemelytra smooth and polished throughout; pronotal disk (see fig. 164) with 10 to 11 transverse dark lines usually complete, highly polished, smooth throughout; vertex, venter and legs stramineous throughout.

Structural characteristics of males: Head: Width of synthlipsis to hind margin of eye as 3.7 : 3.4; vertex moderately projected, approximately one-fifth its length, as seen from above before the eyes; frontal fovea broadly oval, deeply concave, with scattered short setae, no evidence of long hairlike setae in the specimens at hand. Width of pronotal disk to length as 9.3 to 6.0. Prothoracic lateral lobe moderately elongate, slightly narrowed toward apex, regularly rounded apically. Clavi with apices slightly exceeding a line produced through the costal margin of hemelytra at the nodal furrows. Pala as in figure 42. Ratio of lengths of femur, tibia and pala, 4.0 : 3.0 : 3.0; middle leg—femur, tibia, tarsus and claws, 12.0 : 5.8 : 4.0 : 5.5.

Dorsum of abdomen as shown in figure 43. Right clasper as in figure 40; left clasper as in figure 41.

Structural characteristics of the female: Head: Width of synthlipsis to length of hind margin of eye as 4.0 : 3.8. Width of pronotal disk to length as 10.0 : 4.0. Prothoracic lateral lobe moderately elongate slightly narrowed toward apex, regularly rounded apically, surface concave.

Hemelytra (see fig. 183) with length of apical pruinose area of embolar groove to length of nodal furrow as 3.0 : 2.0; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus along inner margin as 1.5 : 13.0. Corium and apical portion of clavus with scattered minute setae, hemelytra also with a few scattered long hairs.

Second segment of abdomen with apex not produced laterally beyond succeeding segment, anterior lateral portion of margin with a polished area. Venter of sixth and seventh segments as in figure 85.

KEY TO SUBSPECIES OF TRICHOCORIXA MENDOZANA

Jaczewski, as may be noted in the bibliographic citation for this species, described *T. mendozana* from Argentina in 1927. In 1933 he described another *Trichocorixa*, *T. dar-pomorza*, from Brazil. A careful study of the original descriptions and their figures, as well as specimens at hand, indicates that *dar-pomorza* can be considered as no more than a subspecies of *mendozana* and possibly additional material will show it to be no more than a variety. The two forms may be separated as follows:

1. Females 2
Males 3
2 (1). With width of synthlipsis equal to posterior width of an eye.
T. mendozana mendozana Jaczewski, 1927. (p. 331)
With width of synthlipsis greater than posterior width of an eye.
T. mendozana dar-pomorza Jaczewski, 1933 (p. 332)
3 (1) Right clasper with apex nearly as broad as width at middle.
T. mendozana mendozana Jaczewski, 1927 (p. 331)
Right clasper with apex less than half as wide at apex as at middle.
T. mendozana dar-pomorza Jaczewski, 1933 (p 332)

Trichocorixa mendozana mendozana Jaczewski, 1927

(Plate XLIX, figs. 40-43, plate LII, fig 85, plate LIII, figs. 130-133, plate LV, fig. 164, plate LVII, fig. 183; plate LXI)

Bibliographic references as listed above under numbers 1, 2 and 3. See figures 40-43, 85, 130-133, 164, and 183.

Types: "Argentina, leg. A. C. Jensen-Haarup: Prov. de Mendoza, 3 females; Pedregal, Mendoza, Dec. 14, 1906; same locality, Jan. 6, 1907, 2 males, 5 females.

"A microscopic slide prepared from the male specimens from Pedregal has been chosen as the type." *

These specimens were not seen by the author. It is assumed that they are still in the Polish Museum of Natural History at Warsaw.

Distribution: See Plate LXI, fig. 209. In addition to the above, Monte, Argentine, March 2, 1909 [Carnegie Museum]; Prov. de la Rioja [Ejemplar unico en el Museo] (De Carlos).

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* Taken from original description.

Trichocorixa mendozana dar-pomorza Jaczewski, 1933

(Plate XLIX, figs. 37-39; plate LIII, figs. 127-129; plate LXI)

Bibliographic reference as listed for *mendozana* under number 4. See figures 37-39, 127-129.

Types: "Parahyba, Dec. 2, 1931, a ditch near the river Jaguaribe (No. 47), 2 males, 12 females. A slide prepared from one of the males has been chosen as holotype." *

The specimens were not seen by the author. It is assumed that they are still in the Polish Museum of Natural History at Warsaw.

Distribution: See Plate LXI, figure 209. In addition to the above, Horqueta, Paraguay, 45 miles east, Paraguay River, December 7, 1935 (Alberto Schulze).

Comparative notes concerning species: T. mendozana appears to represent the South American counterpart of *T. verticalis* (Fieber), with which it has several characters in common. The shape of the strigils and the shape of the left posterior lobe of the males are similar. The females of each show a similar pronounced asymmetry of the venter of the abdomen. The claspers of the males also present the same general form.

In spite of these similarities, the differences are quite pronounced; *T. mendozana* averages larger in size; the second segment of the abdomen of the female is not produced laterally at the apex as it is in *T. verticalis;* the synthlipsis is wider in proportion to the width of an eye; and the pala of the male of *T. mendozana* is considerably more elongate than that of *T. verticalis.*

10. *Trichocorixa minima* (Abbott)

(Plate L, figs. 56-59; plate LIII, figs 125-126, plate LV, fig. 157; plate LVII, fig 180; plate LXIV)

1913. *Corixa minima* Abbott, J. F. Bulletin of the Brooklyn Entomological Society, vol. 8, No. 6, pp. 86-87, fig. 3.

1917. *Corixa minima,* Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico . . . , p. 486.

1926. *Corixa pulchra* Blatchley, W. S. Heteroptera . . . of Eastern North America, pp. 1085-1086. NEW SYNONYMY.

Size: Males, 3.2-3.5 mm.; females, 3.5 to 3.8 mm.

Color and sculpture: Pattern of hemelytra reticulose, left membrane with markings almost effaced; oblique lines on basal portion of clavus usually narrowed or obsolete at inner angle; costal margin usually infuscated throughout length; hemelytra smooth and polished; pronotal disk with five to six transverse dark bands, these bands usually twice the width of intervening stramineous areas;

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* Taken from original description.

pronotal disk lightly roughened in both sexes, highly polished; vertex stramineous with a median longitudinal line, and with a lateral area on either side infuscated in both sexes; thorax tinged with fuscous below costal margin of wing; venter usually stramineous, though frequently with median apex of seventh segment and the posterior lobes slightly infuscated; legs stramineous except the swimming hairs on hind tarsus, which are infuscated.

Structural characteristics of male: Head with width of synthlipsis to hind margin of eye as 2.0 : 3.0; vertex but slightly projected, rounded before eyes; frontal fovea oblong, reaching the eyes laterally, shallowly concave, covered with numerous long hairs, particularly on anterior portion. Width of pronotal disk (see fig. 157) to length as 6.5 : 4.0; prothoracic lateral lobe slightly narrowed to apex, regularly rounded apically. Clavi with apices barely reaching a line produced through the costal margins of hemelytra at the nodal furrows. Pala as in figure 56. Ratio of lengths of femur, tibia and pala of foreleg, 2.9 : 2.3 : 2.0. The apex of the tibia usually shows a membranous fingerlike process projecting beyond apex from ventral side. The middle leg has ratio of 9.8 : 4.5 : 3.5 : 4.3 for lengths of femur, tibia, tarsus and claws.

Dorsum of abdomen as shown in figure 59; right clasper as in figure 57; left clasper as in figure 58.

Structural characteristics of female: Width of synthlipsis to width of hind margin of an eye as 2.5 : 3.3. Width of pronotal disk to length as 4.3 : 3.9, prothoracic lateral lobe slightly narrowed to apex, rounded apically.

Hemelytra (see fig. 180) with nodal furrow at apex of pruinose portion of embolar groove; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus along inner margin as 2.5 : 10.0. Apical third of clavus with numerous short spinose to long hairlike setae; a noticeable patch of longer setae laterally along basal portion of apical third Apical half of corium with numerous short spinose setae; these are more numerous on median discal portion laterad the apex of the clavus, where they tend to form three triangularly arranged patches; the corium also bears a few long hairlike setae.

Second segment of the abdomen with the lateral margin not projecting in a barblike process, but joined to succeeding segment at an acute angle laterally, the dorsal portion bearing a pronounced flange upon which the costal margin of the wing normally rests.

The shape of the sixth abdominal sclerite and the arrangement of the pubescence on the venter symmetrical. Venter of seventh abdominal segment with median lobe not reaching apices of laterotergites.

Holotype: Male, Thalman, Ga., April (Cornell).

Allotype: Thalman, Ga., April 28 (Cornell).

Paratypes: Male, Offerman, Ga.; female, Thalman, Ga. (Cornell).

Homotypes: Forty-one, Hilliard, Fla., August 19, 1930 (J. Nottingham). [Francis Huntington Snow Entomological Collections.]

Comparative notes: T. minima is most nearly related to *T. macroceps* (Kirkaldy) and to *T. naias* (Kirkaldy). It differs from the former in that both sexes have a noticeably longer pronotal disk, and from the latter by its smaller size and fewer lines on the pronotal disk. The limited distribution of *T. minima,* when compared with *T. macroceps* and *T. naias,* suggests the existence of some limiting ecological factor worthy of investigation.

Distribution: See Plate LXIV, fig. 212. In addition to data for type and homotype series.

Georgia: Okefenokee Township, July 30, 1934 (M. E. Griffith).

Florida: Everglades, Oasis, July 30, 1930 (R. H. Beamer); Plant City, August 15, 1930 (J. Nottingham); Likely, July 24, 1934 (P. McKinstry); Suwannee Spring, July 29, 1930 (R. H. Beamer); Branford, July 31, 1930 (R. H. Beamer); Gainesville, December 14, 1937 (H. B. Hungerford); Naples, August 11, 1930 (J. Nottingham); Biscayne Bay (Mrs. A. T. Slosson); Jacksonville; Fruitville, August 11, 1930 (P. W. Oman); Lacoochee, August 18, 1930 (J. Nottingham); Archer, July 31, 1930 (J. Nottingham); Wakullah, July 10, 1939 (P. B. Lawson); Loughman, August 2, 1930 (P. W. Oman); Old Town, July 11, 1939 (P. B. Lawson); Cedar Keys, July 12, 1939 (R. H. Beamer); Lake City, August 5, 1939 (R. H. Beamer); Dunnellon, July 12, 1939 (D. E. Hardy); Fort Myers, November 15, 1911; La Belle, July 16, 1939 (E. G. Wegenek); Eridu, July 11, 1939 (J. D. Beamer); Hudson, July 13, 1939 (D. E. Hardy); Sanford, August 8, 1939 (D. E. Hardy); Wildwood, August 2, 1930 (L. D. Tuthill); Bradenton, August 6, 1938 (W. Benedict).

CUBA: Yaguaramas, December 12 (W. H. Sligh); Palpite Ciénaga de Zapute, S. C. Province, December 6, 1932 (P. J. Bermudez).

11. *Trichocorixa naias* (Kirkaldy)

(Plate L, figs 60-63; plate LIII, figs 117-124; plate LV, fig 159; plate LVII, fig. 182; plate LXIV)

1901. *Corixa sexlineata* Champion, G C. Rhynchota Heteroptera II, Biologia Centrali Americana, p. 379.

1882. [Non.] *Corixa sexlineata* Reuter, O. M Ofvers Finska Vet Soc Forhandl, vol. 25, p. 42.

1908. *Arctocorisa naias* n nom Kirkaldy, G. W., and Bueno, J R de la Torre-. Proceedings of the Washington Entomological Society, vol 10, p. 196

1927. *Trichocorixa championi* Jaczewski, T. Annales Zoologici Musei Polonici Historiae Naturalis, vol. 6, No 3, p 367.

1928. *Trichocorixa naias,* Hungerford, H. B. Bulletin of the Brooklyn Entomological Society, vol 23, p. 174.

1928 *Trichocorixa sexlineata*, Lundblad, O Entomologisk Tidskrift, vol 48, Haft 4, p. 242.

1929. *Trichocorixa reticulata,* Lundblad, O. Archiv fur Hydrobiologie u Planktonkunde, Bd. 20, pp 317-320, figs 23, 24, 25, 26, and 27.

1931. *Trichocorixa sexlineata*, Lundblad, O. Zoologischer Anzeiger, Bd 96, Heft 3/4, pp. 91-92.

1931. *Trichocorixa reticulata*, Jaczewski, T Archiv fur Hydrobiologie u Planktonkunde, Bd. 23, p. 519

1939. *Trichocorixa naias*, Jaczewski, T. Annales Zoologici Polonici, vol 13, No 23, pp. 281-283 Illus , fig 16, male type, pala; fig 17, male type, left paramere side

1943 *Tricocorixa* [sic] *verticalis*, Rau, P Entomological News, vol 54, No 10, pp 258-259. (This article was based on a mixed series containing some specimens of *naias*)

Length: Males, 3.3 mm.-3.8 mm.; females, 3.7 mm.-4.4 mm.

Color and sculpture: Pattern of hemelytra with lineations tending toward transverse, frequently inosculate and confused, dark lines usually wider than intervening pale areas; lines at base of clavus somewhat oblique, narrowed, frequently broken toward inner angle; costal margin usually infuscated throughout length; corium smooth, clavus very lightly roughened and both highly polished. Pronotal disk (see fig. 159) with six to seven transverse dark lines, usually twice the width of the intervening pale areas, lightly roughened throughout, anterior portion rugose. Vertex with median longitudinal line infuscated, usually with an area on each side just in from the eyes also infuscated, these sometimes uniting in males causing the vertex to be uniformly darkened; hind margin of head usually edged in fuscous. Lateral portions of thorax tinged with fuscous; fore pala, hind tibia along edges and swimming hairs on hind tarsus usually more or less infuscated; otherwise the venter and legs stramineous.

Structural characteristics of male: Head: Width of synthlipsis to width of hind margin of eye as 2.6 : 3.6; vertex but slightly projected, rounded before eyes; frontal fovea broadly oval, reaching eyes laterally, noticeably concave, with numerous long hairlike setae, these often rubbed off. Width of pronotal disk to length as 8.0 : 4.7; prothoracic lateral lobe somewhat elongate (*i. e.*, nearly twice as long as wide at middle), noticeably narrowed to apex, anterior apical angle acute to narrowly rounded. Clavi with apices slightly exceeding a line produced through costal margins at the nodal furrows. Pala as in figure 60. Ratio of lengths of femur, tibia and pala of foreleg, 3.2 : 2.8 : 1.7. Tibia with a fingerlike membranous process produced from lower side of apex. Femur, tibia, tarsus, and claws of middle leg, 10.7 : 5.5 : 3.6 : 5.2.

Dorsum of abdomen as shown in figure 63. Right clasper as in figure 61; left clasper as in figure 62.

Structural characteristics of female: Head: Width of synthlipsis to width of hind margin of an eye as 3.0 : 3.9. Width of pronotal disk to length as 3.6 : 4.8; prothoracic lateral lobe relatively broad, anterior apical angle usually narrowly rounded.

Hemelytra (see fig. 182) with length of apical pruinose area less than length of nodal furrow; area small, wedge-shaped. Ratio of distance from apices of clavi to line projected through costal margins at nodal furrows to length of clavus along inner margin as 2.5 : 11.0. Apical third of clavus and apical half of corium with numerous scattered minute spinose setae, these sometimes more numerous on the median discal portion of corium, forming an irregular patch. A few scattered hairlike setae on both corium and clavus.

Second segment of the abdomen not produced laterally beyond line of succeeding segment, the lateroposterior angle acute, dorsal surface with a flange upon which the costal margin of the hemelytra normally rests. Venter of sixth segment but slightly concave medially; venter of the seventh segment not produced apically beyond apices of laterotergites; shape of sclerites and arrangement of pubescence symmetrical.

Types: This species was described from a single specimen taken at Toupa, Tabasco, Mexico (H. H. Smith). The specimen was studied and drawings made in 1928 by Hungerford. This material, though not published, was available for this study. In 1939 Jaczewski also studied this specimen and published drawings of the male pala and the left clasper. This type should be located in the British Museum; however, it is not definitely known that Jaczewski was able to return the specimen before the outbreak of war in September of that year.

Allotype: Female, Río Francisco, Veracruz, Mexico, August, 1932 (R. R. Soto) [In Francis Huntington Snow Entomological Collections].

Variations within species: *T. naias,* except in size, is an unusually stable form throughout its range.

Comparative notes: This species is closely allied to *T. minima* (Abbott), but may be distinguished from the latter by its larger size, the shape of the hemelytra of the female, the shape of the pronotum and the number of lines across it.

Distribution: See Plate LXIV, fig. 212, in addition to data for allotype.

MEXICO: *Veracruz:* Cardel, 30 miles west of Veracruz, San Francisco, at light, August 3, 1932 (A. Dampf).

Campeche: Ciudad Carmen, September 11-16, 1936 (H. D. Thomas); January 23, 1939 (A. Dampf); La Lucha, January 10, 1939 (A. Dampf); El Suspiro, January 13, 1939 (A. Dampf); on river boat at trap light, April 15, 1938 (A. Dampf); Hahucha, January 10, 1939 (A. Dampf), at light.

Tabasco: Januta, December 30, 1939 (A. Dampf), at light; Pocivuc, January 1, 1939 (A. Dampf); Reforma, January 4, 1939 (A. Dampf); Frontera, December 11, 1937 (A. Dampf).

U. S. A.: *Texas:* McAllen, November 20, 1932 (L. D. Tuthill); Jackson County, August 9, 1928 (R. H. Beamer); Athens, December 5, 1938 (D. D. Millspaugh); Colorado County, April 3, 1922 (Mrs. Grace Wiley); Cedar Lane, August 9, 1928 (R. H. Beamer).

Louisiana: Baton Rouge, March 9, 1929 (R. M. DeCoursey); Tallulah, August 15, 1929 (J. G. Shaw).

Mississippi: Leland, September 14, 1921; Bay St. Louis, July 9, 1934 (P. McKinstry).

Kansas: Doniphan County, July 23, 1924 (R. H. Beamer).

Iowa: Wall Lake, July 24, 1924 (C. J. Drake); Lyon County, June 27, 1940; Dickinson County, June 23, 1940; Worth County, July 4, 1940; Clay County, July 1, 1940 (Iowa Insect Survey); Mt. Pleasant, September 23, 1929 (D. Smith); Burlington (H. G. Griffith).

South Dakota: Humbolt, June 11, 1940, 10 miles south (H. C. Severin); Brookings, July 29, 1942 (H. C. Severin); Ortley, July 24, 1940 (H. C. Severin); Clear Lake, August 11, 1939, 6 miles northwest (H. C. Severin); Lake Oakwood, June 14, 1923 (H. C. Severin); Arlington, June 19, 1939 (H. C. Severin); Wessington, June 20, 1939 (H. C. Severin); Big Stone Lake, September 13, 1939 (H. C. Severin).

Colorado: Weizenhorn Lake, Boulder, October 6, 1913 (M. M. Ellis).

Minnesota: Faribault, June 14, 1923 (A. A. Granovsky); Cannon Falls, August 16, 1934 (A. A. Granovsky); Pine River, Big Trout Lake, August 22, 1939 (H. C. Severin); Becker County, Shell Lake, August 22, 1922 (H. B. Hungerford); St. Paul, Golf Club Pond, July 28, 1921 (H. B. Hungerford); Rochester, July 16, 1921 (H. B. Hungerford); Minnehaha Creek, Hennepin County, July 9, 1921 (H. B. Hungerford); North Branch, June 17, 1922 (C. E. Mickel); Cooley, Aug. 13, 1937 (C. L. Johnston); Pelican Rapids, August 22, 1922 (H. B. Hungerford); Evelcth, August 13, 1937 (C. L. Johnston); Bird Island, August 25, 1921 (Wm. E. Hoffman); Two Harbors, August 9, 1922 (H. B. Hungerford).

Alberta: Edmonton, July 4, 1915 (E. H. Strickland).

Manitoba: Winnipeg Beach, August 23, 1910 (J. B. Wallis).

Ontario: Ottawa, August 18, 1914 (G. Beaulieu); Trenton, July 28, 1908 (Evans).

Wisconsin: Dane County, Mendota, July 29, 1911 (J. G. Sanders); August 27, 1916 (Wm. S. Marshall).

Illinois: Lake Forest (J. G. N.); Jerseyville, August 7, 1892 (Titus); Chicago, June 3, 1906 (W. J. Gerhard); Worth, October 9, 1910 (W. J. Gerhard); Havana, June 25, 1895 (Hart).

Michigan: Ann Arbor, July 30, 1921 (R. F. Hussey); Cheboygan County, August 5, 1935 (M. Sanderson); Oakland County, Milford, September 31, 1921 (R. F. Hussey); Berrien County, New Buffalo, September 2, 1919 (R. F. Hussey); Battle Creek, August 22, 1920 (Priscilla Butler); Washtenaw County, September 2, 1919 (Hussey).

Indiana: Clarke Junction, August 7, 1904 (W. J. Gerhard); Kosciusko County, June 9, 1902; Summit County, August 31, 1916 (C. J. Drake).

New York: Ithaca, July 17, 1917 (H. B. Hungerford); Batavia, August 9, 1913 (H. H. Knight); Syracuse, August 25, 1917 (C. J. Drake); Renwick, Ithaca, July 12, 1920; White Plains, September 21, 1907 (Bueno); V. Cortlandt Park, July 25; Rochester.

Massachusetts: Nonamesset, August, 1911 (J. F. Abbott); Woods Hole, August, 1911 (J. F. Abbott); Chicopee, September 7, 1903.

Pennsylvania: Philadelphia, August 10, 1929 (J. C. Lutz); Chamounix Lake, Philadelphia, July 14, 1941 (J. C. Lutz).

District of Columbia: Washington.

Virginia: New Church, July 14, 1935 (L. D. Anderson); Norfolk, July 4, 1931 (Geo. E. Gould).

Georgia: Okefenokee Swamp, July 25, 1939 (J. D. Beamer).

Florida: Orlando, January 12, 1938 (H. B. Hungerford); Gainesville, December 14, 1937 (H. B. Hungerford); Homestead, August 9, 1930 (L. D. Tuthill); Dunnellon, July 12, 1939 (D. E. Hardy); Lacoochee, August 18, 1930 (J. Nottingham); Deerfield, August 6, 1930 (P. W. Oman); Branford, July 16, 1934 (J. D. Beamer); Sarasota, March 2, 1911; Fort Myers, August 14, 1930 (J. Nottingham); 25 miles west Miami, July 22, 1934 (P. McKinstry); Fruitville, August 11, 1930 (P. W. Oman); La Belle, July 16, 1939 (R. H. Beamer); Plant City, June 20, 1936 (C. O. Bare); Bradenton, August 6, 1938 (W. Benedict).

CUBA: Palpite Ciénaga de Zapute, S. C. Province, December 6, 1933 (P. J. Bermudez); Río Canimar, crossing Carretera, Central Matanzas, June 10, 1932 (P. J. Bermudez); Catalina, Havana Province, November 27, 1933 (P. J. Bermudez).

12. *Trichocorixa orinocoensis*, n. sp.

(Plate XLIX, figs. 33-36; plate LV, fig. 162, plate LVII, fig. 184; plate LXI)

Length: Males, 4.3 mm.; females, 4.3 mm.-4.5 mm.

Color and sculpture: Pattern of hemelytra tending toward definite transverse lineations, lines undulate, frequently inosculate and confused; oblique lines on basal portion of clavus pronounced, narrowed toward inner angle, females with lineation often broken on median discal portion of clavus; hemelytra, smooth and polished throughout. Vertex stramineous, but bearing numerous minute black punctures. Venter and legs stramineous, swimming hairs of hind tarsus infuscated.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 3.3 : 3.6; vertex slightly projected before eyes; frontal fovea oval, shallowly concave, covered with numerous hairlike setae (these are often rubbed off). Width of pronotal disk to length as 9.0 : 6.1; prothoracic lateral lobe moderately elongate, slightly narrowed toward apex, narrowly rounded apically. Clavi with apices failing, by one-sixth the length of inner margin of clavus, to reach line projected through costal margins at the nodal furrows. Pala as in figure 34. Ratio of lengths of femur, tibia and pala of foreleg, 3.8 : 3.0 : 2.5; femur, tibia, tarsus and claws of middle leg, 14.0 : 6.5 : 4.2 : 5.6.

Dorsum of abdomen as shown in figure 33; right clasper as in figure 35; left clasper as in figure 36.

Structural characteristics of female: Head: Width of synthlipsis to width of hind margin of eye as 3.5 : 3.75. Width of pronotal disk to length as 3.5 : 6.0; prothoracic lateral lobe, truncate at apex, somewhat rectangular in shape.

Hemelytra (see fig. 184) with length of apical pruinose area of embolar groove slightly exceeding length of a nodal furrow; ratio of distance from apices of clavi to line projected through costal margins at nodal furrows to length of clavus along inner margin as 1.5 : 11.0. Corium and clavus with scattered minute spinose setae and a few long hairlike setae, an irregular row of the latter often noticeable along inner margin of clavus.

Second segment of the abdomen joined to the succeeding segment at an acute angle lateroposteriorly, not projected laterally beyond line of succeeding segment, with a well-developed flange on the dorsal surface upon which the costal margin of the hemelytra normally rests. Venter of sixth abdominal segment deeply concave, sometimes biconcave medially; venter of seventh segment produced medially slightly beyond apices of laterotergites, narrowly rounded to almost angulate medially; shape of sclerites and arrangement of pubescent patches symmetrical.

Holotype: Male, Palma Sola, Falcon, Venezuela, March 9, 1920 (J. and E. B. Williamson) [Francis Huntington Snow Entomological Collections].

Allotype: Female, as above.

Paratypes: 9 as above; 9 with collecting data as above; 7, La Brea, Trinidad, from pools on surface of pitch lake, October 18, 1918 (Harold Morrison) [U. S. N. M.]; 7 as above; 2, Parahyba, latitude 7, longitude 36, Brazil (Stillman Wright); 1, Dept. Atlantico, Bocas Pedeniza, Colombia, 1926 (Carl C. Addison) [Francis Huntington Snow Entomological Collections].

Variation within species: The series from Trinidad is very dark, the lineations of the hemelytra and pronotal disk diffuse, the pale intervening area often only faintly indicated, except at inner basal angle of clavus; females with an irregular pale area on median discal portion of clavus. Anterior portion of the pronotal disk decidedly rastrate. Morphologically, however, they vary little from the typical form. It is assumed that this series shows an adaptation to a local condition, namely, its association with the pools on the surface of the pitch lake, the dark almost concolorous pattern serving to render it less conspicuous against the dark pitch background.

Comparative notes: This species is quite distinct and its relationship to the other species of the genus is necessarily obscure. It probably can be considered as arising from the same original stock as that producing *T. mendozana*, *T. verticalis* and *T. kanza*. The shape of the left posterior lobe separates *T. orinocoensis* from all other species, while the female may be recognized by the oblique grooving of the costal margin before the nodal furrow.

Distribution: See Plate LXI, fig. 209. As listed for type material, and with the following additional locality: Nickeric Bigipan, Dutch Guiana, February, 1943 (D. C. Geiskes).

13. *Trichocorixa parvula* (Champion), 1901

(Plate XLVIII, figs 21-24; plate LII, figs. 88, 90; plate LV, fig. 160; plate LVIII, fig. 186; plate LXIII, text fig 4)

1901. *Corixa parvula* Champion, G C. Rhynchota Heteroptera, II, Biologia Centrali Americana, p 378.

1931 *Trichocorixa parvula*, Lundblad, O Zoologischer Anzeiger, Bd 96, Heft 3/4, p 92.

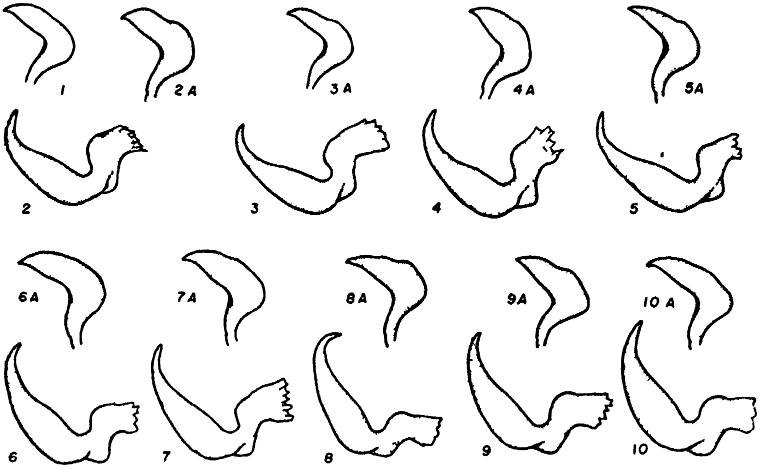
1931 *Trichocorixa parvula*, Jaczewski, T Annales Musei Zoologici Polonici, vol 9, No. 5, pp. 214-217, pl. 28, figs 43-46, pl. 29, fig 66

Length: Males, 3.4 mm.-3.8 mm.; females, 3.7 mm.-4.2 mm.

Color and sculpture: Lineation of hemelytra tending toward transverse, undulate and inosculate; lineation on basal portion of clavus somewhat oblique, slightly narrowed toward inner angle; female often with lineation broken on median discal portion of clavus, forming an irregular pale area; the dark lines on hemelytra usually not so wide as intervening pale areas; hemelytra smooth and polished throughout. Pronotal disk (see fig. 160) with 12 to 13 dark more or less complete transverse lineations, pronotum minutely roughened, almost smooth and polished. The costal margin of the hemelytra usually somewhat infuscated; vertex usually stramineous, but sometimes with median longitudinal line lightly infuscated; venter and legs, except darkened swimming hairs of hind tarsus, stramineous.

Structural characteristics of male: Head (see fig. 90): Width of synthlipsis to hind margin of an eye as 2.6 : 3.0; vertex projected before about one-fifth length of head as seen from above; frontal fovea broadly ovate, reaching eyes laterally, deeply concave and usually covered with numerous long hairs. Width of pronotal disk to length as 7.0 : 5.0; prothoracic lateral lobe narrowed toward apex, narrowly rounded apically. Clavi with apices slightly exceeding a line produced through the costal margins of hemelytra at the nodal furrows. Pala as in figure 21. Ratio of length of femur, tibia and pala of foreleg, 3.0 : 2.2 : 1.7; femur, tibia, tarsus and claws of middle leg, 10.5 : 4.5 : 3.0 : 4.8.

Dorsum of abdomen as shown in figure 24; right clasper as in figure 22; left clasper as in figure 23. Also see text figure 4 in which intraspecific variation in the shape of these structures is illustrated.


1
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1 REDRAWN FROM HUNGERFORD'S SKETCH OF TYPE.
2, 3, 4, 5, 6 MORELIA, MICHOACAN, MEXICO.
7, 8, 9 JALISCO. MEXICO
10 PATZCUARO, MICHOACAN MEXICO

FIGURE 4

Structural characteristics of female: Head: Width of synthlipsis to hind margin of an eye as 3.0 to 3.75. Width of pronotal disk to length as 8.0 : 5.4; prothoracic lateral lobe rather broad (not twice as long as wide), anterior apical angle narrowly rounded to acute.

Hemelytra (see fig. 186) with length of apical pruinose area of embolar groove twice the length of the nodal furrow; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus along inner line as 2.0 : 10.5. Apical third of clavus and apical two thirds of corium with numerous minute spinose setae; clavus and corium usually with a few scattered long setose hairs.

Second segment of the abdomen acutely angulate at posterolateral angle, the apex projecting slightly beyond lateral edge of succeeding sclerite and thickly covered with a darkened pile. Venter of sixth and seventh segment and posterior lobes as in figure 88.

Notes concerning types: The species was described from a single male taken at Presidio de Mazatlan, on the east coast of Mexico. This type is now in the British Museum. Notes and drawings made by Hungerford in 1928 were available for the study (text fig. 1). In 1931 Jaczewski published drawings of the pala and claspers of the type in addition to a redescription of both the male and the female; however, since no allotype was established the following specimen is so designated:

Allotype: Pátzcuaro, Michoacán, Mexico, August 31, 1938 (H. D. Thomas) [Francis Huntington Snow Entomological Collections].

Comparative notes: This species stands near to *T. confusa,* but may be distinguished from the latter in the case of the female by the shape of the embolar groove (see figs. 185 and 186), also by the arrangement of the pubescence on the venter of the seventh abdominal segment. The lineations of the pronotum and hemelytra are finer and more numerous in *T. parvula* than in *T. confusa.* This latter character seems possibly the best means of separating the males, for while the shape of the claspers of *T. confusa* is stable in the specimens studied, a great variety of form is exhibited in *T. parvula* even among specimens taken in the same locality (see text fig. 1). The vertex of *T. parvula* is usually a little less prominent and a little wider than *T. confusa,* though this too does not appear stable (see figs. 90 and 11). This species is unique for the extreme variation of the genital characters. *T. parvula* probably represents a form intermediate between *T. reticulata* and *T. verticalis.*

Distribution: See Plate LXIII, fig. 211. In addition to data for type and allotype, MEXICO: Morelia, Michoacán, September 4, 1938 (H. D. Thomas); La Barea, Jalisco, Río Lerma, 1536 m. a. s. l., October 3, 1934 (A. Dampf); 20 miles south Guadalajara, Jalisco, September 14, 1938 (H. D. Thomas); Tizapán, February 8, 1929 [Francis Huntington Snow Entomological Collections]; records taken from Jaczewski, 1931, as follows: Texcoco, August 4, 1929, pool and in canal; Ocotlán, Jalisco, August 8, 1929; Tizapán, Jalisco, August 11, 1929, large muddy pool (it was from here that the largest number of specimens recorded were captured); Chapala, Jalisco, August 16, 1929; Pátzcuaro, Mich., August 31, 1929.

14. *Trichocorixa reticulata* (Guérin-Méneville)

(Plate L, figs. 44-47; plate LII, fig. 94; plate LIV, figs 134-150; plate LVI, figs 172-178, plate LIX, figs 196-199; plate LXI)

1857 *Corisa reticulata* Guérin-Méneville, F. E *In* Sagra's Hist de Cuba, vol 6, p. 423. (Cuba)

1859. *Corixa wallengreni* Stal, C. Zoologi, vol 4, p. 268. (San Francisco, Calif.)

1877. *Corixa blackburni* White, F Buchanan Ann. and Mag Nat Hist , vol 4, No 20, p. 114. (Hawaiian Islands.)

1878. *Corixa blackburni*. White, F Buchanan Ann and Mag. Nat. Hist., vol. 5, No. 1, p. 366.

1894. *Corisa reticulata*, Uhler, P. R [London] Zool. Soc. Proc., p. 224.

1901. *Corixa mariae* Champion, G. C. Rhynchota Heteroptera, vol 2, Biologia Centrali-Americana, p. 378. (Tres Marias Islands.)

1910. *Arctocorisa blackburni*, Kirkaldy, G. W. Fauna Hawaiiensis, vol. 2, No. 6, p. 554.

1913. *Arctocorisa blackburni*, Perkins, R. C. L. Fauna Hawaiiensis, vol 1, No. 6, p cciii.

1927 *Trichocorixa mariae*, Jaczewski, T. Ann. Mus. Zool. Polonici Hist. Nat., vol. 6, No. 3, p. 257.

1928 *Trichocorixa blackburni*, Hungerford, H. B. Brooklyn Ent. Soc. Bul, vol. 23, p. 174.

1929. *Trichocorixa wallengreni*, Lundblad, O Ent. Tidskr, vol. 50, No 1, pp. 24-26, fig. 5, a-b; pl. IV, fig 5. (Type material studied places *blackburni* as a synonym)

1930. *Trichocorixa wallengreni*, Jaczewski, T Mitt. aus dem Zool Staatsinst u Zool. Mus. Hamburg, vol. 44, p 148.

1931. *Trichocorixa wallengreni*, Jaczewski, T. Ann. Mus. Zool Polonici, vol. 9, No. 15, p. 214.

1931. *Trichocorixa mariae*, Jaczewski, T Ann Mus. Zool. Polonici, vol 9, No. 15, p 214 (Suggests that *mariae* is a synonym of *wallengreni*)

1931 *Trichocorixa reticulata*, Lundblad, O. Zool. Anz., Bd. 96, heft 3/4, p 91 (Exclusive of citations other than Guérin-Méneville, 1857.)

1931. *Trichocorixa mariae*, Lundblad, O Zool. Anz., Bd. 96, heft 3/4, pp. 91, 93.

1931 *Trichocorixa wallengreni*, Lundblad, O. Zool. Anz, Bd. 96, heft 3/4, pp. 90, 91, 92.

1931. *Trichocorixa wallengreni*, Hutchinson, G E Amer. Nat., vol 65, pp. 573-574.

1933. *Trichocorixa wallengreni*, Hoffman, W. E. Lingnan Sci Jour., vol 12, Supplement, p. 258.

1933. *Trichocorixa wallengreni*, Jaczewski, T. Ann Mus. Zool. Polonici, vol 9, No. 21, p. 337.

1933 *Trichocorixa reticulata*, Jaczewski, T. Ann Mus. Zool Polonici, vol. 9, No. 21, p. 338.

1939. *Trichocorixa wallengreni*, Jaczewski, T. Ann. Mus. Zool. Polonici, vol. 13, No. 23, p. 284.

1939 *Arctocorixa blackburni*, Adamson, A. M. Bernice P. Bishop Mus Bul. 159, p. 43

1941 *Trichocorixa wallengreni*, Hoffman, W. E. Lingnan Sci Jour., vol 20, No 1, p 21.

1944 *Arctocorixa blackburni*, Williams, F. X Hawaii. Ent. Soc. Proc, vol 12, No. 1, pp. 195-196, fig. 16. (Excellent illustration of female; also valuable notes pertaining to habits.)

1946. *Trichocorixa reticulata*, Sailer, R I Hawaii, Ent Soc Proc., vol 12, No 3, pp 617-620. (Treats synonymy in detail.)

References based on misidentifications.

1926 *Corixa reticulata*, Blatchley, W. S. Heteroptera of Eastern North America, p 1084. (A synonym of *T. louisianae* Jacz.)

1929. *Trichocorixa reticulata*, Lundblad, O Arch. f. Hydrobiol. u. Planktonkunde, vol. 20, pp. 317-320, figs. 23-27. [This treatment is a synonym of *T. naias* (Kirkaldy).]

1931. *Trichocorixa reticulata*, Jaczewski, T Arch f Hydrobiol. u. Planktonkunde, vol. 23, p. 519. [A synonym of *T. naias* (Kirkaldy).]

1931. *Trichocorixa reticulata*, Lundblad, O. Zool. Anz., Bd. 96, heft 3/4, pp. 90, 91, 93. [A synonym of *T. naias* (Kirkaldy).]

Length: Males, 2.8 mm.-4.9 mm., typically 4.0 mm.; females, 3.4 mm.-5.2 mm., typically 4.2 mm.

Color and sculpture: Pattern of hemelytra reticulose, sometimes with lineations tending toward undulate transverse, lines on basal portion of clavus tending toward oblique but usually irregular, broken or inosculate. Basal portion of costal margin infuscated; hemelytra almost smooth and polished throughout; pronotal disk typically with 10 to 11 dark transverse usually complete lines not as wide as intervening pale areas. Vertex yellowish with numerous minute dark punctures throughout. Thorax usually stramineous, occasionally with infuscated areas. Venter of abdomen usually with the posterior segments in both sexes with darkened areas.

Structural characteristics of male: Head: Width of synthlipsis to hind margin of an eye as 4.0 to 3.0; vertex noticeably produced before the eyes and broadly rounded; frontal fovea broadly oval, scarcely reaching the eyes laterally, shallowly concave (see fig. 94), with a few scattered long hairs. Width of pronotal disk to length as 7.5 : 5.0 (see fig. 172). The pronotal disk is quite variable among forms from different localities. See under variation within species. The prothoracic lateral lobe narrowed somewhat toward apex, anterior apical angle narrowly rounded to acute, variable as to length. Clavi with apices just reaching a line produced through the costal margins of the hemelytra at the nodal furrows. Pala as in figure 44. Ratio of length of femur, tibia and pala of foreleg as 3.5 : 3.0 : 3.6; femur, tibia, tarsus and claws of middle leg as 11.3 : 5.2 : 3.8 : 5.0.

Dorsum of abdomen as shown in figure 47; right clasper as in figure 45; left clasper as in figure 46.

Structural characteristics of female: Head: Width of synthlipsis to hind margin of an eye as 4.0 to 3.0. Width of pronotal disk to length as 8.5 : 6.2; prothoracic lateral lobe relatively broad, longitudinally concave, anterior apical angle narrowly rounded.

Hemelytra (see fig. 197) with nodal furrow at apex of pruinose area of embolar groove; ratio of distance from apices of clavi to line projected through costal margins at the nodal furrows to length of clavus along inner margin as 2.0 : 11.0. Corium and clavus with numerous scattered short spinose setae, more sparse and minute posteriorly, apex of clavus with a tuft of three to five longer setae, both also with a few scattered long hairs.

Second segment of the abdomen acutely produced posterolaterally along three-fourths the lateral margin of the succeeding segment; slightly produced posteriorly, lateral to the line of the succeeding segment, producing a scarcely noticeable barb; usually with posterior portion covered with a short brownish pile. Venter of sixth segment noticeably concave medially; venter of seventh segment not produced medially beyond apices of laterotergites, lightly notched or concave medially; both sclerites and arrangement of pubescent patches symmetrical.

Lectotype: Male, Cuba, collected by Guérin-Ménéville [Paris Museum]. See Sailer, 1946, page 618.

Allotype: Female, Manville, Haiti, February 6-10, 1922 [American Museum of Natural History].

Variation within species: As is indicated under measurements of length, this species varies a great deal in size; there is also considerable variation in the proportional size of the pronotum. The greatest contrast is shown between two series from California, one from the Salton Sea and Death Valley regions, the other from Eureka, Albany, and Berkeley. The former is a small form, the males seldom more than 2.8 mm. in length, the pronotal disk is flat with the longitudinal length about equal to the width of the synthlipsis; the male of the latter form is about 4.4 mm. in length, the pronotal disk is convex and one and a half times the length of the synthlipsis. However, because of the similarity of the hemelytra of the females, the shape of the head and the pala and abdomen and claspers of the males (compare figs. 44-47, 134-150, 172-178 and 196-199), no specific separation appears justified. Furthermore, the presence of intergrading forms, to some extent common among individuals from the same locality and more particularly among series from different localities, appears to make the establishment of subspecific forms impracticable.

It is the opinion of this author that the immediate environment, including such factors as food source, salinity of water, temperature of water, etc., are responsible for these variations, and that under certain conditions one form might in a few generations be changed to the other. The scattered localities from which the forms are recorded would seem to support the hypothesis of parallel adaptation. An example of this is illustrated by the records of small individuals from Salton Sea and Death Valley, Calif. (smallest and most uniform); Silverpeak, Nev., hot springs (slightly larger, pronotal disks more convex), and Galapagos Islands, James Island (a long series showing range of variation from the typical form to specimens similar to the Salton Sea form).

The pala of the female was found to vary considerably in the number of hairs along dorsal margin (see figs. 135, 136, 137 and 138).

Comparative notes: T. reticulata probably represents an independent offshoot from the same original stock as *T. verticalis* (Fieber); *T. mendozana* Jaczewski, *T. kanza,* n. sp., and *T. calva* (Say). It most closely resembles *T. beebei,* n. sp., for which it is in all probability the parent form, and from which it differs principally in the shape of the pala of both sexes.

Distribution: See Plate LXI, figure 209.

HAITI: Port au Prince; Manville; Cwi de Sat Plain, September 1925 (W. H. Hoffman).

CUBA: Cabañas.

Puerto Rico: Mono Island, N., December 16, 1942, 1891, W. Bock leg.; Arecibo, May 12, 1935 (Garcia Diaz).

Virgin Islands: Christianstad, St. Croix; St. Croix, February 28, 1925; St. Thomas, February 22, 1925.

Grenada: St. George and Mount Gaeslato, fresh and brackish water (Uhler).

DUTCH GUIANA: Nickerie Bigipan, February, 1941 (D. C. Geiskes).

VENEZUELA: San Estéban, November 22, 1939 (Pablo J. Anduze).

COLOMBIA: Cartagena, December, 1911 (Ujhelyi); Cacaguaiito, May 13, 1910; Río Frío, Magd. G. Salt, June 30, 1927 (W. M. Mann).

ECUADOR: Guayaquil (F. Campos R.); Duran, June 11, 1914 (H. S. Parish).

PERU: Dept. Lima, Chilca, 72 km. south of Lima, salty pond, January 31, 1937 (F. Woytkowski); Lagunas Villa, Dept. Lima, June 8, 1934 (F. Woytkowski).

GALAPAGOS: James Island, July, 1924 (Miss Cheesman); Indefatigable Island, October 25, 1905 (F. X. Williams).

MEXICO: Mazatlán, May, 1934 (B. Hinton); Tolosa, Oaxaca, Isth. Tehuantepec, December 30, 1931 (A. Dampf); Salina Cruz, July 29, 1938 (A. Dampf); Laguna Superior, near Juchitán, Oaxaca, April 27, 1932 (A. Dampf); Matamoros, Tamaulipas, July 21, 1930 (A. Dampf); Tonalá, Chiapas, November 3, 1932 (A. Dampf).

U. S. A.: *New Mexico:* Chaves County, July 8, 1937 (R. H. Beamer); Alamogordo (V. Krocknow); Eddy County, July 9, 1927 (Readio).

Texas: Corpus Christi, November 18, 1932 (L. D. Tuthill); Falfurrias, January 1, 1946 (L. D. Beamer); Mission, December 26, 1945 (L. D. Beamer); Cameron County, August 3, 1938 (J. G. Shaw); Hidalgo County, July 8, 1927 (L. D. Beamer); Boca Chica, June 28, 1938 (D. W. Craik); Eastland County, May 6, 1931 (Mrs. Grace Wiley).

Florida: Tortugas, July 24, 1931, pond on Long Key, salinity 2.34 percent (A. S. Pearse).

Kansas: Lawrence, September 20, 1936, at light (L. S. Henderson).

Nevada: Silver Peak, hot spring No. 4, both cold water and hot, 37.2-39.6° C.

Lower California: San Domingo, July 19, 1938, and Venancio, July 17, 1938 (Michelbacher and Ross).

California: Salton, May 26 (H. G. Hubbard); Salton Sea, May 25, 1940 (R. L. Usinger); Antioch, July 20, 1935 (E. I. Beamer); Albany (C. T. Dodds); Berkeley, October 19, 1921 (C. T. Dodds); Monterey, April 4, 1928 (W. B. Thorpe); Laguna Beach, July 14, 1921 (C. T. Dodds); Carmel, July 31, 1922 (L. S. Slevin); Gaviota, July 19, 1933 (R. H. Beamer); Sausalito Alto, October 29, 1921 (C. T. Dodds); Purissima Baja, October, 1923 (W. M. Mann); Monterey County, April 12, 1914 (L. S. Slevin); Santa Monica, July 31, 1911; San Diego County, Poway Valley, April 9, 1930 (C. and D. Martin); Sunset Beach, July 30, 1935 (R. H. Beamer); Palm City, August 7, 1935 (R. H. Beamer); San Mateo, August 4, 1925 (H. W. Clark); Black Point, Marin County, October 25, 1925 (J. O. Martin); Naples, March 9, 1916 (J. D. Martin); Moss Beach, July 25, 1908; Palo Alto; Menlo Park, January, 1905 (F. Hormung); Eureka, July 15, 1935 (R. H. Beamer); Santa Clara County (Coquillett); Alameda County, October; Redwood City, June 15, 1922, in 6 percent brine (C. D. Duncan); Niles Canyon, September 16 (W. M. Giffard); Death Valley, June 8, 1921 (F. R. Slevin); Badwater, Death Valley, March 13, 1941 (E. C. Van Dyke); Furnassee Cr. Ranch, 15 miles north (F. R. Slevin).

Hawaiian Islands: Honolulu, Oahu, May 5, 1914; Coral Rain Pool, Waikiki, Honolulu, Oahu, January 5, 1930 (F. X. Williams); Waipahu, Oahu, in stock trough, February 28, 1928; Modus Stream, 2,000 ft., Molokai, November 29, 1933, in clear water (F. X. Williams).

CHINA: Shanghai (reported by Lundblad).*

15. *Trichocorixa uhleri*, n. sp.

(Plate II, figs. 13-16; plate VI, fig. 92; plate IX, fig 156; plate XIII, fig. 195; plate XVIII)

Length: Males, 3.6 mm.-3.8 mm.; females, 3.6 mm.-4.0 mm.

Color and sculpture: Lineations on hemelytra and pronotal disk feeble, frequently broken, seldom inosculate except along lateral margin of corium; lines on basal portion of clavus broken, in females, usually effaced at inner angle; lineations on hemelytra noticeably transverse. Pronotal disk with dark bands very narrow, narrowed or obsolete laterally, frequently almost effaced on anterior portion (see fig. 156). Pronotal disk, particularly of female, showing scarcely perceptible minute rastration, polished; corium and clavus smooth polished. Vertex with median longitudinal line frequently touched with reddish brown, otherwise stramineous; venter and legs stramineous throughout.

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* Lundblad, O. Entomologisk Tidskrift, vol 50, heft 1, p 26, 1929

Structural characteristics of male: Head: Width of synthlipsis to hind margin of eye as 3 5 : 3.0; vertex projected almost one-fourth its length as seen from above before the eyes, almost truncate in front; frontal fovea obovate, does not reach the inner margin of the eyes laterally, slightly concave (see fig. 92), with a few scattered long hairs. Width of pronotal disk to length as 8.0 : 5.7; prothoracic lateral lobe with anterior apical angle narrowly rounded. Apices of clavi exceeding a line produced through the costal margin at the nodal furrows by one-tenth the length of clavus along inner margin. Pala as in figure 13. Ratio of length of femur, tibia and pala of foreleg as 3.0 : 2.5 : 2.0; femur, tibia, tarsus and claws of middle leg as 9.4 : 4.4 : 2.8 : 4.0.

Dorsum of abdomen as shown in figure 16; right clasper as in figure 15; left clasper as in figure 14.

Structural characteristics of female: Head: Width of synthlipsis to hind margin of an eye as 3.5 : 3.2. Width of pronotal disk to length as 8.2 : 5.4; prothoracic lateral lobe with surface flat to convex, relatively long, anterior apical angle narrowly rounded.

Hemelytra (see fig. 195) with length of apical pruinose area to length of nodal furrow as 2.0 : 1.5; ratio of distance from apices of clavi to line projected through costal margins at nodal furrow as 1.6 : 10.0. Apical third of clavus and all but basal portion of corium with scattered minute setae; both structures also bear a few scattered long hairs.

Second segment of abdomen forming a subacute angle with succeeding segment posterolaterally, not projected laterally beyond line of succeeding segment. Venter of sixth segment noticeably concave, more deeply so to the right than to the left of the median line; venter of the seventh segment produced medially slightly beyond laterotergites, usually truncate medially, right lateral hair patch usually heavier than left.

Holotype: Male, Fruita, Colo., August 15, 1936, M. B. Jackson [in Francis Huntington Snow Entomological Collections].

Allotype: Female, as above.

Paratypes: 56 males, 63 females as above: *Colorado:* 2 females, Palisades, August 16, 1937 (M. B. Jackson). *New Mexico:* 1 female, White City, July 13, 1936 (R. H. Beamer). *Texas:* 1 male, 2 females, Presidio County, July 16, 1927 (R. H. Beamer). MEXICO: 86 males, 66 females, San Antonio, Chihuahua, July 15, 1927 (R. H. Beamer). *Arizona:* 1 female, Phoenix, August 3, 1917 [2 females of same locality in Cornell Collection]. Nineteen paratypes from the following localities: *New Mexico:* Gila River, July 9 (W. J. Gerhard) [U. S. N. M.]. *Arizona:* [Uhler Collection]; Ft. Yuma, January 28 (Hubbard) [U. S. N. M.].

Variation within species: Size and color in this species vary little. The males and females average more nearly the same length than any of the other species of the genus.

Comparative notes: Most closely related to *T. kanza*, n. sp., from which it differs in the shape of the male pala, smaller size and lighter color. The shape of the hemelytra of the female is much the same; however, in *T. uhleri* the apical pruinose area is noticeably longer than the fore tibia of the female, while in *T. kanza* these two structures are of almost equal length.

Distribution: See Plate LXIV, figure 212. As listed for type series.

16. *Trichocorixa verticalis* (Fieber)

Figures enumerated under subspecific names

(1) 1851. *Corisa verticalis* Fieber, F. X. Species generis Corisa, Acta Reg Bohem Soc Scient., p 24, pl. I, No. 22. [Reprint]

(2) 1851 *Corisa pygmaea* Fieber, F. X. Op cit.

(3) 1908. *C Trichocorixa pygmaea,* Kirkaldy, G W Canadian Entomologist, vol 40, p. 118.

(4) 1913. *Corixa verticalis,* Abbott, J. F. Bulletin Brooklyn Entomological Society, vol 8, p. 87.

(5) 1913. *Corixa pygmaea,* Abbott, J. F. Op. cit.

(6) 1913. *Corixa sellaris* Abbott, J. F. Op. cit., pp. 85-86, fig. 9.

(7) 1923. *Corixa verticalis*, Abbott, J. F. Corixidae *in* Guide to Hemiptera or Sucking Insects of Connecticut. Conn. State Geol. and Nat. Hist. Survey Bul., No 34, p 390.

(8) 1926. *Corixa verticalis*, Blatchley, W. S. Heteroptera . . . of Eastern North America, p. 1084.

(9) 1929. *Trichocorixa verticalis,* Lundblad, O Archiv fur Hydrobiologie und Planktonkunde, Bd. 20, pp 312-317, figs. 19-22, pl. XII, fig. 6.

(10) 1929. *Corisa pygmaea* = *Trichocorixa verticalis* Lundblad, O. Op. cit.

(11) 1930. *Trichocorixa fenestrata* Walley, G. S. Canad. Ent., vol 62, p. 81, pl. X, fig. 15. (New synonymy—reduced to subspecies.)

(12) 1931. *Trichocorixa verticalis*, Lundblad, O. Zoologischer Anzeiger, Bd. 96, Heft 3/4, pp. 91, 92.

(13) 1931. *Trichocorixa sellaris,* Lundblad, O. Op. cit., pp. 91, 92, 93. (New synonymy —reduced to subspecies.)

(14) 1931. *Trichocorixa fenestrata,* Lundblad, O. Op. cit., p. 92.

(15) 1931. *?Trichocorixa verticalis,* Jaczewski, T. Archiv für Hydrobiologie u. Planktonkunde, Bd. 23, p. 516.

(16) 1932. *Trichocorixa sellaris,* Pearse, A. S. Carnegie Institution of Washington, Publication No. 485, pp. 130-132, 135.

(17) 1933. *Trichocorixa verticalis,* (Fieber) 1851 = *T. reticulata* (G-M.) 1857,* Jaczewski, T. (1933). Annales Musei Zoologici Polonici, vol. 9, No. 21, p. 338. (Applies to specimen sent to Jaczewski for study; see 33, p. 618.)

(18) 1936 *Trichocorixa verticalis,* Pearse, A. S. Elisha Mitchell Sci Soc. Jour., No. 2, p. 201.

(19) 1943. *Tricocorixa* [sic] *verticalis,* Rau, P. Ent News, vol. 54, No 10, pp. 258-259. (The use of the above name is based upon a misidentification. The majority of the specimens should be referred to. *T. kanza,* however, *T. calva* and *T. naias* were also included.)

(20) 1946. *Trichocorixa verticalis,* Sailer, R. I Hawaiian Ent. Soc. Proc , vol. 12, No 3, p. 618.

This species includes five subspecies and a variety, and is therefore the most variable of the genus.

General description of species:† Length: Male, 3.6 mm.-4.6 mm., typically 3.9 mm.; female 3.8 mm.-5.4 mm., typically 4.3 mm.

Color and sculpture: Color pattern variable; corium and clavus smooth and polished, pronotal disk noticeably rugose with a variable number of transverse bands, the rastration often being more pronounced on the darkened bands; vertex and frons, venter of thorax and abdominal legs stramineous.

Structural characteristics of male: Vertex rounded and noticeably projected before the eyes. Clavi with apices not or scarcely reaching a line produced through the costal margins at the nodal furrows. Pala as in figure 64. Dorsum of abdomen as in figure 67.

Structural characteristics of female: Hemelytra with the apical pruinose area about equal in length to the nodal furrow. Apices of clavi failing by one-fourth the length of the inner margin of clavus to reach a line drawn through the nodal furrows. Clavus with numerous minute setae, these often lengthened and more numerous on laterobasal portion of apical third of clavus. Corium with minute setae scattered throughout. A few long hairs on surface of both clavus and corium.

Second segment of abdomen angularly produced laterally along two-thirds the length of the succeeding segment; posterolateral apex produced to form a barb projecting beyond line of succeeding segment, just in front of the costal emargination when the hemelytra are in normal resting position. This structure is usually glabrous but sometimes covered with pile. Venter of abdomen, sixth, seventh and eighth segments as in figure 86.

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* This decision was based on a study of a cotype from a type series containing both species.
† For complete description proceed through key to subspecific forms.

KEY TO SUBSPECIES OF TRICHOCORIXA VERTICALIS

1. Males 2

Females 7

2 (1). Width of synthlipsis equal to or exceeding length of hind margin of eye as seen from dorsolateral position 3

Width of synthlipsis less than length of hind margin of eye as seen from dorsolateral position 4

3 (2). Length of head as seen from above greater than length of tarsus of middle leg .... *T. verticalis saltoni*, new subspecies (p. 357)

Length of head as seen from above less than length of tarsus of middle leg. *T. verticalis californica*, new subspecies (p. 352)

4 (2). Synthlipsis equal to or exceeding width of hind margin of eye as seen from above 5

Synthlipsis less than width of hind margin of eye as seen from above 6

5 (4). Right genital clasper as in figure 82 .... *T. verticalis fenestrata* Walley, 1930 (p. 354)

Right genital clasper as in figure 70 .... *T. verticalis interiores*, new subspecies (p. 354)

6 (4). Larger, not less than 4.3 mm., dark forms with 11-12 dark transverse lines across pronotal disk .... *T. verticalis* var. *sellaris* (Abbott), 1913 (p. 361)

Smaller, seldom more than 4.2 mm., lighter forms no more than 10 dark transverse lines across pronotal disk .... *T. verticalis verticalis* (Fieber), 1851 (p. 358)

7 (1). Prenodal polished area of costal margin not exceeding the length of the tarsus of middle leg .... *T. verticalis saltoni*, new subspecies (p. 357)

Prenodal polished area of costal margin definitely exceeding length of the tarsus of middle leg 8

8 (7). Distance between facial angles of eyes equal to or exceeding length of prenodal polished area 9

Distance between facial angles of eyes less than length of prenodal polished area 10

9 (8). Costal margin appearing distinctly notched anterior to prenodal polished area (see fig 203), the latter appearing half-folded along inner line of area, sharply so anteriorly, then gradually flattened to nodal furrow. *T. verticalis fenestrata* Walley, 1930 (p. 354)

Costal margin only slightly emarginate before prenodal polished area, this area horizontal or nearly so .... *T. verticalis interiores*, new subspecies (p. 354)

10 (8). Width of synthlipsis less than length of hind margin of an eye as seen from above 11

Width of synthlipsis exceeding length of hind margin of an eye as seen from above .... *T. verticalis californica*, new subspecies (p. 352)

11 (10). Larger, length not less than 4.8 mm., barblike, posterolateral apex of second abdominal segment covered with a short pile. *T. verticalis* var. *sellaris* (Abbott), 1913 (p. 361)

Smaller, length not exceeding 4.6 mm., barblike, posterolateral apex of second abdominal segment glabrous .... *T. verticalis verticalis* (Fieber), 1851 (p. 358)

16a. *Trichocorixa verticalis californica*, new subspecies

(Plate LI, figs. 75-76; plate LII, figs. 105; plate LVI, fig. 168; plate LX, fig. 208; plate LXII)

Length: Males, 4.5 mm.; females, 5.0 mm.

Color and sculpture: Darker generally than any of the other subspecies of *verticalis*. Lines on corium frequently fusing to form irregular solidly infuscated area, otherwise inosculate with slight transverse tendency. Oblique lines on basal portion of clavus narrowed toward inner angle forming a lighter area. Dark lines of pronotal disk (see fig. 168) impressed somewhat, and rastrate. Vertex with more or less infuscated area at apex. Costal margin usually almost black. Posterior surface of abdominal venter tinged with fuscous.

Structural characteristics of male: As in general discussion and in key. Frontal fovea ovate, scarcely reaching the eyes, shallowly concave laterally, vertex with scattered minute black punctures.

Ratio of lengths of femur, tibia and pala of foreleg as 3.6 : 3.3 : 2.8, femur, tibia, tarsus and claws of middle leg as 14.0 : 6.0 : 4.8 : 6.0.

Right clasper as in figure 76; left clasper as in figure 75.

Structural characteristics of female: As in general discussion and key. Embolar groove of hemelytra as in figure 208. Front view of head of female as in figure 105.

Holotype: Male, Eureka, Calif., July 15, 1935 (R. H. Beamer) [In Francis Huntington Snow Entomological Collections].

Allotype: Female, as above.

Paratypes: 13 males, 15 females, as above; 8 males, 16 females, Antioch, Calif., July 20, 1935 (R. H. Beamer) [In Francis Huntington Snow Entomological Collections]; 2 males, 5 females, Moss Beach, San Mateo County, Calif., July 4, 1929 (R. L. Usinger) [Usinger Collection].

Distribution: See Plate LXII, figure 210e. As given above.

Comparative notes: It is difficult to assign a definite relationship to this subspecies. The similar shape of the genital claspers (see figs. 75, 76, 73, 74) seem to indicate a close alliance to *T. verticalis saltoni;* however, it is much larger and darker, and it seems likely that both these forms evolved from subspecies *T. verticalis interiores,* which is common in the western plains and intermountain region of North America. The large size and dark color of *T. californica* cause it to resemble superficially *T. verticalis* var. *sellaris* of the eastern coast of North America. This represents an interesting parallelism.

16b. *Trichocorixa verticalis fenestrata* Walley, 1930

(Plate LI, figs. 81-83; plate LII, fig. 101; plate LVI, fig. 170; plate LX, fig 203; plate LXII)

Bibliographic reference as listed above under numbers 11 and 14.

Length: Males, 4.0 mm.; females, 4.4 mm.

Color and sculpture: Pronotal disk as in figure 170. Lineations on corium forming a reticulose pattern; those of clavus inosculate, obliquely transverse on basal portion, narrowed slightly towards inner angle, otherwise as in general description of species.

Structural characteristics of male: Frontal fovea broadly oval, reaching eyes laterally, shallowly concave. Ratio of lengths of femur, tibia and pala of foreleg as 3.6 : 3.2 : 2.6; femur, tibia, tarsus and claws of middle leg as 11.6 : 5.7 : 4.0 : 5.3.

Dorsum of abdomen as in figure 83; right clasper as in figure 82; left clasper as in figure 81.

Otherwise as in general discussion of species and in key.

Structural characteristics of female: Hemelytra as in figure 203. Front view of female head as in figure 101. Otherwise as in general description and in key.

Holotype: Male, Natoshquan, Quebec, August 9, 1929 (W. J. Brown) [Canadian National Museum].

Allotype: Female, as above.

Paratypes: 15 males, 15 females, as above.

Distribution: See Plate LXII, figure 210d. In addition to above, Pt. Neuf, Quebec [Uhler Collection, U. S. N. M.].

Comparative notes: This subspecies appears to be an offshoot of *T. verticalis interiores;* although the shape of the claspers is quite distinct, the broad face and vertex seem to establish this relationship. The shape of the hemelytra of the female is the most distinctive character separating it from the other forms.

16c. *Trichocorixa verticalis interiores,* new subspecies

(Plate LI, figs. 68-72; plate LII, figs 102-108; plate LVI, fig. 171; plate LX, figs 201-202; plate LXII)

Length: Male, 2.8 mm.-4.5 mm., typically 4.1 mm.; females, 3.4 mm.-5.2 mm., typically 4.3 mm.

Color and sculpture: Pattern on corium rather coarsely reticulate, clavus with the usual oblique lines weakened somewhat at inner basal angle. Pronotal disk as in figure 171. See also variation within subspecies. Otherwise as in general description.

Structural characteristics of male: Frontal fovea ovate, not quite touching inner margin of eyes laterally, shallowly concave. Ratio of lengths of femur, tibia and pala of foreleg as 3.5 : 3.0 : 2.6; femur, tibia, tarsus and claws of middle leg as 11.5 : 3.6 : 4.0 : 5.0.

Dorsum of abdomen as in typical form (see fig. 68); right clasper as in figure 70; left clasper as in figure 69.

Otherwise as in general description and in key.

Holotype: Male, Eastland County, Tex., May 24, 1921 (Mrs. Grace Wiley) [Francis Huntington Snow Entomological Collections].

Allotype: Female, as above.

Paratypes: 16 males, 35 females, as above. *New Mexico:* 12 females and males, Alamogordo (Krocknow) [12 females and males from same locality in American Museum of Natural History]; 145 additional paratypes from the following localities: Torrance County, September 25 (C. H. Martin); Chaves County, July 8, 1927 (R. H. Beamer); Belen, July 20, 1936 (R. H. Beamer); Springer, July 17, 1936 (M. B. Jackson); 25 miles west Tularosa, July 1, 1940 (R. H. Beamer); White Sands, July 14, 1936 (R. H. Beamer); Eddy County, July 9, 1927 (P. A. Readio); Colfax County, August 21, 1927 (R. H. Beamer). *Nevada:* Fallon, August 9, 1929 (L. D. Anderson). *Utah:* 9 miles west of Corinne, April 13, 1935 (G. F. Knowlton) (13 same locality, G. F. Knowlton Collection); Brigham City, warm springs, April 13, 1935 (G. F. Knowlton) (15 same locality, Utah Experiment Station); Saltair, June 29, 1922 (E. P. Van Duzee) (6 same locality, Calif. Acad. of Sciences); Hot Springs No. 31, temperature 35.3° C., Hot Springs Station (Brues). *Kansas:* Atchison, July 15, 1924 (R. H. Beamer); Stafford County, salt marsh, May 30, 1934 (D. A. Wilbur) (1 specimen same locality, Kansas State Agricultural College Collection).

Distribution: See Plate LXII, fig. 210c. *Texas:* In addition to above, Jeff Davis, July 8, 1933, Valentine, July 12, 1938 (L. W. Hepner).

New Mexico: As given above and Mountain Park, June 27, 1940 (D. E. Hardy).

Idaho: Burley, July 6, 1931 (L. D. Anderson).

Utah: As given above.

Colorado: 2022 (Collection C. F. Baker); Las Animas County, September 22, 1927 (R. H. Beamer).

Kansas: As above and Clark County, June (F. M. Snow).

Nebraska: Lincoln, July, at light; Neligh, June 18, 1909 (J. T. Zimmer).

South Dakota: Waubay Refuge, alkali water, June 22, 1940; Brookings, S. Dak., August 2, 1942 (H. C. Severin); Eureka, June 25, 1940 (H. C. Severin); Piedmont, July 14, 1937 (H. T. Peters); Clear Lake, August 11, 1939, 6 miles northwest (H. C. Severin); Roslyn, September 14, 1934 (H. C. Severin); Redfield, July 20, 1937 (R. H. Beamer).

North Dakota: Devil's Lake, July 23, 1920 (T. H. Hubbell); Tokio, July 28, 1937 (R. H. Beamer); Lake Metagoshe, July 30, 1937 (H. T. Peters); Fargo, July 26, 1937 (C. L. Johnston); Hillsboro, July 26, 1937 (R. H. Beamer); Nelson County, Stump Lake, July 24, 1920 (T. H. Hubbell); Tappen, July 23, 1937 (C. L. Johnston).

Minnesota: Stephen, August 10, 1937 (H. T. Peters); Cooley, August 31, 1937 (C. L. Johnston).

Manitoba: Shoal Lake, August 31, 1937 (H. T. Peters); Russell, August 1, 1937 (C. L. Johnston); Churchill, August 2-9, 1937 (D. G. Denning); Red Deer River, August 3, 1937 (H. T. Peters); Baldur, July 22, 1921 (J. B. Wallis).

Saskatchewan: Margo Lake, July 2, 1939 (J. E. Moore); Quill Lake, September 12, 1938 (D. S Rawson); Redberry Lake, August 26, 1938 (D. S. Rawson).

Variation within subspecies: A considerable variation in size is shown here. The smallest examples are from Red Deer River, Manitoba. Most of these specimens also show not more than six to eight bands on the pronotal disk; however, the series shows a few typical and intermediate forms. There is a series of unusually large individuals bearing the label Colorado [C. F. Baker Collection], the females of which range up to 5.5 mm. in length, with about 12 narrow dark lines across the pronotal disk.

Comparative notes: This subspecies differs from the others as pointed out in the key. It represents the form of *T. verticalis* common to the interior of the continent, more particularly of the Great Plains and intermountain regions, and is probably the parent stock for the subspecies *T. saltoni*, *T. californica* and *T. fenestrata*.

16d. *Trichocorixa verticalis saltoni*, new subspecies

(Plate LI, figs 73-74; plate LII, fig. 104; plate LVI, fig 169; plate LX, fig 207; plate LXII)

Length: Males, 4 mm.; females, 4.3 mm.

Color and sculpture: Generally light, lineations on corium loosely reticulate, apical portion of clavus much as corium, basal portion with the transverse oblique lines noticeably narrowed and frequently broken. Vertex thickly sprinkled with minute black punctures; pronotal disk as in figure 169. Otherwise as in general description.

Structural characteristics of male: Frontal fovea oblong, does not reach inner margin of eyes laterally, slightly concave Vertex projecting more than one-fourth length of head as seen from above, most prominent of the various forms of *verticalis*. Ratio of lengths of femur, tibia and pala of foreleg as 3.3 : 2.8 : 2.2; femur, tibia, tarsus and claws of middle leg as 12.4 : 5.4 : 3.5 : 4.2.

Right clasper as in figure 74; left clasper as in figure 73.

Otherwise as in general description and key.

Structural characteristics of female: Costal margin of hemelytra as in figure 207. Front view of female head as in figure 104. Otherwise as in general description and key.

Holotype: Male, Holtville, Cal., July 2, 1929 (R. H. Beamer) [Francis Huntington Snow Entomological Collection].

Allotype: Female, as above.

Paratypes: 10 females, 13 males, as above; 1 male, San Diego County, Cal., July 7, 1929 (L. D. Anderson); 1 male, San Diego County, Cal., July 28, 1929 (P. W. Oman); 4 males, 5 females, 15 miles north Furnace Creek, Death Valley, Cal., June 8, 1931 (J. R. Slevin) [8 males, 10 females, from above series in Calif. Acad. of Science Collection]. *Arizona:* 1 male, Fort Yuma, January 4 (Hubbard) [U. S. N. M.]; Phoenix, August 2, 1917 [Cornell Collection]; 27 males, 18 females, Gila Bend, August 13, 1935 (R. H. Beamer).

Variation within subspecies: This form, judging from specimens at hand, is very stable; the females show the greatest variation, from 4.0 mm. to 5.0 mm. in the series from Gila Bend, Ariz.

Comparative notes: *T verticalis saltoni* is the most distinct form of *verticalis*. The more projecting vertex of the male, and the very short prenodal polished area of the costal margin, easily separate it from *T. verticalis interiores*, from which it appears to have descended. The genital claspers show a noticeable similarity to *T.*

verticalis californica; however, in view of the other differences it seems likely that these forms arose independently of each other.

Data on distribution: See Plate LXII, fig. 210f.

16c. *Trichocorixa verticalis verticalis* (Fieber), 1851

(Plate LI, figs. 64-67; plate LII, figs. 86, 95-98; plate LIII, figs. 106-111; plate LVI, figs. 165-166; plate LVII, fig. 179; plate LX, figs. 200, 204; plate LXII)

Bibliographic references as listed for above under numbers 1-5, 8-10, 12, 15-20.

Length: Males, 2.9 mm.-5 mm.; females, 3.0 mm.-4.4 mm., the latter figure about typical in both instances.

Color and sculpture: Lineation on hemelytra tending toward transverse, sometimes reticulose, lines inosculate, occasionally undulate. The dark lines seldom wider than intervening pale areas. The oblique lines on the basal portion of the clavus somewhat narrowed toward inner angle but usually complete. Vertex thickly sprinkled with minute dark punctures, and frequently lightly infuscated on median and lateral areas. Pronotal disk as in figure 165. Costal margin usually lightly infuscated. Otherwise as in general description.

Structural characteristics of male: Frontal fovea of male oblong, scarcely reaching eyes laterally, shallowly concave. Vertex projecting in front of eyes from above. Ratio of lengths of femur, tibia and pala of foreleg as 3.2 : 2.7 : 2.3; femur, tibia, tarsus and claws as 12.4 : 6.0 : 3.9 : 5.0 (middle leg).

Dorsum of abdomen as in figure 67; right clasper as in figure 65; left clasper as in figure 66. For variation in shape of claspers see figures on Plate LIII.

Structural characteristics of female: Hemelytra as in figure 200. See also figures 106-111, showing variation of costal margin. Otherwise as in general description and key.

Types: The types of this species were redescribed by Lundblad (*24*, 1929) and are at present in the Museum of Berlin. They were collected by Zimmermann and are recorded simply as "From Pennsylvania."

Distribution: See Plate LXII, fig. 210a. *Pennsylvania:* As above.

New York: Queens Village, Long Island, August 4, 1941 (J. C. Lutz).

Virginia: Norfolk, July 4, 1931 (Geo. E. Gould); Onley, August 22, 1932 (W. D. Strong); Chincoteague Island, May 4, 1912 (H. W. Fowler).

North Carolina: Beaufort, 1945 (A. S. Pearse).

Florida: Key Largo, August 9, 1930 (P. W. Oman); Ch. Harbor (Mrs. A. T. Slosson); Royal Palm Park, March 19, 1924 (W. S. Blatchley); Marco, April 17, 1912; Indian River; Everglade, April 7, 1912; Lakeland, November 10, 1912; Cocoanut Grove, August 9, 1930 (P. W. Oman); Apalachicola, August 25, 1935 (A. S. Pearse), salinity 10.75 percent.

CUBA: Matanzas, May 20, 1933 (P. J. Bermudez); Cueva Camarones, Coljímar, Habana, December 21, 1933 (P. J. Bermudez); Río San Juan, Pueblo Nuēvo, Matanzas, June 18, 1932 (P. J. Bermudez); Río Bucy Yaca, Matanzas, May 12, 1932 (P. J. Bermudez); Cabañas, P. de R., September 5, 1913; Havana, January 25, 1932 (P. J. Bermudez).

Puerto Rico: Arecibo Isabela, May 12, 1935 (Garcia Diaz); Cabo Rojo, April 4, 1937 (J. A. Ramos); Río Piedras, November 1924; San Turce, January 1, 1914.

HAITI: Petionville, alt. 2,500 ft., 7 miles from Port au Prince (Smith); Manville, February 18, 1922.

Virgin Islands: St. Thomas, February 24, 1925.

Grenada: St. George's (leeward side) (H. H. Smith); Caliveny est. (windward side) (H. H. Smith).

Guadeloupe: July 20, 4,000 ft. alt. (A. Busck).

Bermuda: Spittal Pond, July, 1924 (L. Oggilvie).

Cayman Islands: Little Cayman, south coast, South Town (C. B. Lewis and G. H. Thompson).

Jamaica: Palm Beach, Montego Bay, March 11, 1911; Balaclava, April 20, 1909.

British Honduras: Punta Gorda, February, '31 (J. J. White).

MEXICO: Morelia, Michoacán, September 3, 1938 (H. D. Thomas); Carmen, Campeche, January 24, 1939 (A. Dampf); Pátzcuaro, Michoacán, August 31, 1938 (H. D. Thomas); Guadalajara, Jalisco, September 10, 1938 (H. D. Thomas); Yucatán, Dzixulb, south of Ciénaga, August 2, 1932 (E. Creasser); Agua Fría, Hidalgo (near Jacala), July 28, 1937 (H. D. Thomas); La Mochis, Sinaloa, June 13, 1922 (C. T. Dodds); Matamoros, Tamaulipas, June 21, 1930 (A. Dampf).

U. S. A.: *Texas:* Cameron County, June 28, 1928 (R. H. Beamer); Victoria County, August 9, 1928 (R. H. Beamer); Jackson County, August 9, 1928 (R. H. Beamer); Corpus Christi, November 18, 1932 (L. D. Tuthill); Brownsville, June 30, 1938 (R. I. Sailer); Mission, December 26, 1945 (L. D. Beamer); Aransas Pass, January 1, 1946 (L. D. Beamer); Sequin, June 26, 1938 (R. I. Sailer); Progreso, July 1, 1938 (R. I. Sailer); Hidalgo County, July 28, 1928 (J. G. Shaw); Bowie County, August 20, 1928 (R. H. Beamer); Sinton, November 8, 1932 (L. D. Tuthill); Brazoria County, August 10, 1928 (R. H. Beamer); Galveston, June 16, 1922 (Mrs. Grace Wiley); Cedar Lane, August 9, 1928 (R. H. Beamer); Boca Chica, June 30, 1938 (R. I. Sailer); Falfurrias, November 2, 1932 (L. D. Tuthill); Richmond, Brazos River, June 22, 1914; Gillett, Karnes County, June 25, 1917.

New Mexico: Deming, Luna County, July 12, 1917.

Louisiana: Sabine River Ferry opp. Orange, June 20, 1917; Rayne, June 20, 1917; Buras, salt marsh, October 30, 1937 (E. S. Hathaway).

Mississippi: Waveland, July 9, 1934 (P. McKinstry); Bay St. Louis, July 9, 1934 (R. H. Beamer); Ocean Springs, March 27, 1932 (H. Dietrich).

Alabama: Mobile, June 12, 1917.

Variation within species: This form is quite stable structurally, however, the variation in size and color is great. The darkest forms are those found along the Atlantic seaboard of the United States and on Bermuda, appearing to grade into the very large and dark variety *sellaris*. Representatives from most localities of Texas are very light in color, the oblique lines on the inner basal angle of the clavus effaced, the other lineation of the hemelytra and of the pronotal disk much narrowed and frequently broken. The smallest individuals are recorded from the Tortugas, Bush Key, salinity 2.46 percent. These also have the number of lines on the pronotal disk reduced (seven to eight).

Comparative notes: This form is here accepted as typical in the zoölogical sense for the reason that it would appear to be the form from which the other subspecies have been derived. Structure and, more important, distribution seem to substantiate this view (see fig. 210b). For variation of various structures see figures 65-66, 79-80, 95-100, 106-111, 165-167, 200, 204-206.

Nomenclatorial notes: As noted in the bibliography, this species was first described by Fieber, who at the same time described *pygmaea*. The former, as has already been pointed out, was given page priority. As previously mentioned, Lundblad in 1929 made a restudy of the types and found them to be conspecific. It seems likely that Fieber in 1851 was impressed by the distance intervening between Pennsylvania and Cuba, believing it unlikely that one species would have so wide a distribution; this combined with the slightly larger, darker appearance of the Pennsylvania form, caused him to name them as different species. It is also obvious from Fieber's illustration that he did not recognize the female of the Cuban form, for his figure of the female pala is obviously that of a male. It is possible that this figure was actually drawn from a male of the species now known as *T. reticulata.*

In the material studied by this author, no specimens of this species were found from Pennsylvania. The specimens chosen as representative of the type as illustrated by Lundblad, and from which illustrations were made, were from Norfolk, Va. These specimens appeared to be intermediate between the Gulf coast form and the variety *sellaris.* Since the latter form is common in the coastal region both north and south of Pennsylvania, with different localities showing various intermediate forms, it seems likely that the variation depends largely upon the local environment. This, however, remains one of the many problems concerning this genus that must await more careful and more complete collecting data. A study of the biology of the species as affected by different environmental factors should prove valuable.

16cc. *Trichocorixa verticalis* var. *sellaris* (Abbott), 1913

(Plate LI, figs 77-80, plate LII, figs 99-100, plate LVI, fig 167; plate LX, figs 205-206, plate LXII)

Bibliographic references as listed above under numbers 6-7, 13

Length: Males, 4.4 mm.; females, 5.0 mm.

Color and sculpture.—Much as in typical forms, but darker. The lineations of hemelytra as wide as, and usually wider than, intervening pale area; those of pronotal disk always wider. Corium and clavus smooth; pronotal disk noticeably rastrate. Costal margin infuscated. Vertex, venter and legs usually tinged with dull reddish brown on a ground color of light yellow. See figure 167, illustrating the pronotal disk.

Structural characteristics: Other than the larger size, much as in typical form. The barblike posterolateral projection of the second abdominal segment of female not bladelike and glabrous, usually covered entirely with a short pile and edge thickened.

See figures 99-100 for front view of head of female; 77-80 for genital claspers; and 205 and 206 for costal margins of hemelytra.

Types: Holotype, female, Brunswick, May 3; paratypes from St Simon's Island and Thalmann, Georgia [Cornell Collection].

Distribution: Georgia: As above.

North Carolina: Beaufort, June 18, 1934 (A. T. Pearse).

New Jersey: Cape May, June 4; Salt Meadows, Newark, August 23.

New York: New Rochelle, August 3, 1910; Cold Springs Harbor, Long Island, brackish tide pool, July 8, 1920 (Priscilla Butler).

Connecticut: East River, August 2, 1910 (Chas. R. Ely); Branford, August 28, 1905 (H. W. Winkley).

Rhode Island: Kingston.

Massachusetts: Nonamesset, July, 1911 (J. F. Abbott); Fall River, July 8, 1910 (N. S. Easton); Beach Bluff, July 19, 1915 (H. M. Parshley).

New Hampshire: Hampton, June 24, 1933 (S. A. Shaw).

Maine: Mt. Desert Island, August 12, 1934 (Wm. Procter).

Comparative notes: See comparative notes for typical form—*T. verticalis verticalis.*

Nomenclatorial notes: Sellaris is used here in a quadrinomial sense as a variety of the typical subspecies. The large size and dark color set the form apart with little difficulty; however, since available evidence indicates that these characteristics are dependent upon optimum ecological factors, the use of a subspecific name does not seem warranted. The tendency toward production of the characteristics noted here is found in other species, notably in *T. reticulata;* however, the degree of intergradation is greater than is shown in the case of *T. v.* n. var. *sellaris.*

LIST OF SPECIES OF TRICHOCORIXA WITH SYNONYMS *

1. *Trichocorixa arizonensis,* new species.
2. *Trichocorixa beebei,* new species.
3. *Trichocorixa borealis,* new species.
4. *Trichocorixa calva* (Say), 1832.
    Corixa calva Say, 1832 (*34,* p. 366).
    Corisa burmeisterii Fieber, 1851 (7, p. 24).
5. *Trichocorixa confusa,* new species.
6. *Trichocorixa kanza,* new species.
7. *Trichocorixa louisianae* Jaczewski, 1931 (*17,* p. 516).
8. *Trichocorixa macroceps* (Kirkaldy), 1908.
    Arctocorixa macroceps Kirkaldy, 1908 (*21,* p. 119).

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* Includes only proposed names. For complete synonymy see bibliography of species involved.

9. *Trichocorixa mendozana* Jaczewski, 1927 (*12*, p. 258).
  a. *Trichocorixa mendozana mendozana* Jaczewski, 1927.
  b. *T. mendozana dar-pomorza* Jaczewski, 1933 (*18*, p. 3).
10. *Trichocorixa minima* (Abbott), 1913.
  Corixa minima Abbott, 1913 (*1*, p. 86).
  Corixa pulchra Blatchley, 1926 (*4*, p. 1083).
11. *Trichocorixa naias* (Kirkaldy), 1908.
  Corixa sexlineata Champion, 1901 (*6*, p. 379).
  [Non.] *Corixa sexlineata* Reuter, 1882 (*32*, p. 42).
  Arctocorisa naias Kirkaldy, 1908 (*21*, p. 118).
  Trichocorixa championi Jaczewski, 1927 (*12*, p. 257).
12 *Trichocorixa orinocoensis*, new species.
13. *Trichocorixa parvula* (Champion), 1901.
  Corixa parvula Champion, 1901 (*6*, p. 378).
14. *Trichocorixa reticulata* (Guérin-Méneville), 1857.
  Corixa reticulata Guérin-Méneville, 1857 (*8*, p. 423).
  Corixa wallengreni Stål, 1859, (*35*, p. 268).
  Corixa blackburni White, 1877 (*39*, p 114).
  Corixa mariae Champion, 1901 (*6*, p 378).
15 *Trichocorixa uhleri*, new species.
16. *Trichocorixa verticalis* (Fieber), 1851.
  Corixa verticalis Fieber, 1851 (*7*, p. 24)
  Corixa pygmaea Fieber, 1851 (*7*, p 24)
  a. *T verticalis californica*, new subspecies
  b *T. verticalis fenestrata* Walley, 1930.
    T. fenestrata Walley, 1930 (*38*, p. 81).
  c. *T. verticalis interiores*, new subspecies
  d *T. verticalis saltoni*, new subspecies
  e . *T. verticalis verticalis* Fieber, 1851, as above.
  ee *T. verticalis verticalis* var *sellaris* (Abbott), 1913.
    Corixa sellaris Abbott, 1913 (*1*, p. 85)

SYSTEMATIC GROUP ARRANGEMENT OF SPECIES

a. Male strigil ovoid, not curved, less than 18 combs
  b Nodal furrow at apex of pruinose area of embolar groove (females)
    c. Male strigil oval, four to six striae
      macroceps
      minima
      naias
    cc. Male strigil elongate, 10 or more combs.
      reticulata
      beebei
  bb. Nodal furrow dividing pruinose area of embolar groove into apical and basal portions (females).
    d. With the dorsolateral angle of the left posterior lobe of abdomen flattened, lobate (males).
      verticalis
      mendozana
    dd. With the dorsolateral angle of the left posterior lobe of the abdomen slightly thickened, but not lobate.
      confusa
      parvula

aa. Male strigil curved more or less lunate, 18 or more combs.
  b. Left posterior lobe of abdomen concave along lateral margin.
    orinocoensis
  bb. Left posterior lobe of abdomen convex along lateral margin
    c. Male strigil appearing as heavy dark line along margin of left lateral lobe of sixth segment
      calva
    cc. Male strigil not appearing as a heavy dark line; at point of greatest width at least one-sixth as wide as long.
      d. Apical pruinose portion of embolar groove equal to or exceeding width of synthlipsis.
        borealis
      dd. Apical pruinose portion of embolar groove less than width of synthlipsis.
        kanza
        uhleri
        arizonensis
        louisianae

Species Incorrectly Placed in Trichocorixa

1. *Trichocorixa persica* Jaczewski, 1927 (*13*, pp 417-419) = *Heliocorisa vermiculata* (Puton), 1874.*

Geographical Distribution and Origin

The genus *Trichocorixa* is confined to the continents of North and South America with their associated and neighboring islands. The one exception is Lundblad's record of *T. reticulata* (*24*, p. 26) from Shanghai, China. This same species is common in the Hawaiian Islands, and it seems most likely that it found its way from there across the Pacific by ships, either living in water tanks or barrels as adults, or possibly, as suggested by Hutchinson (*11*), transported as eggs in wet salt. Since there is but this one well substantiated trans-Pacific record, it is impossible to ascertain the extent of its occupation of the Asiatic shore.

There is one specimen in the collection of the United States National Museum that somewhat complicates this picture; a male of the species *T. calva* bearing the label P. (hilippine) I. (slands), steamer Albatross. This species does not, so far as is known to the author, occur west of the Rocky Mountains. The specimen is typical of the form occurring in the neighborhood of Washington, D. C.; therefore, it may be assumed that if the label is correct, this insect, or rather its progenitors, was carried on shipboard to the other side of the earth. In view of the fact that the Albatross was sent to the Pacific in 1888, remaining there and first visiting the Philippines in 1899, this would seem a very remote possibility. At least until more collecting data is available, this record must be considered, in all likelihood, a case of mislabeling.

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* Archives de Zool. Exp. et Gén., 77, p. 493.

Insular distribution in this genus presents several interesting problems involving insect dispersal. The presence of *T. reticulata* in the Hawaiian Islands in 1877,[*] would seem to indicate that this species was established possibly before the coming of white men to the Islands. This author has studied numerous representatives of this species from Hawaii and found them to be identical to the large dark form commonly found on the Californian coast in the neighborhood of San Francisco. A natural means of dispersal is suggested here, since the California current which sweeps this coast, moving southwest, becomes the northern equatorial current and eventually swings in westward past the Hawaiian Islands. The ability of this species to flourish in the sea water of coastal tide pools strengthens this possibility. However, it must also be noted that ships crossing to the Hawaiian Islands, particularly in the days of sailing ships, made San Francisco their last mainland port of call.

Far to the south, representatives of the genus *Trichocorixa* are also recorded from the Galapagos Islands. Here is found not only the form of *T. reticulata* common to the Peruvian coast but, at least on Tower Island, a closely related species *T. beebei,* which, although clearly related, appears to have been isolated for a long time from its original stock. Tower Island is small and located about 50 miles northeast of the main group, thus providing a well isolated location. Here dispersal by ocean currents, in this case the southern equatorial current, seems the most logical explanation. Should this be true it might be assumed that these insects, being swept by the current into the main body of islands, would have a better opportunity to establish themselves on shore than those that might be swept along tiny Tower Island. The ancestral form of *T. beebei* would then have less opportunity to be reinforced by the typical stock and consequently greater opportunity to maintain specializations of structure. The larger populations of the chief islands of the archipelago would also undoubtedly tend to submerge any variation that might arise.

Another possible explanation would present *T. beebei* as representing descendents of a form present when the islands were connected by a land bridge to the mainland, and *T. reticulata* (G.-M.), common on James Island, as being imported by ships from Peru. Further collecting in these islands and better knowledge of local conditions should throw considerable light on this problem. The final proof of dispersal by ocean currents awaits the certain knowledge that these insects can subsist on marine plankton for a considerable length of time.

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[*] White described *Corixa blackburnii* [= *T. reticulata* (G.-M.)] from Hawaii in 1877 (*39*, p. 114).

The presence of *T. verticalis verticalis* (Fieber) in Bermuda, far out in the Atlantic, is a different matter, since no representative of the family Corixidae was known there before 1927. In July of that year L. Ogilvie, of the Bermuda Agricultural Station, recorded a swarm of these insects descending into tubs of water in his backyard following a severe storm. Thereafter he was also able to collect them in pools on the island. A long series of these insects was available for study by the author. They are a rather large dark form resembling *T. verticalis* var. *sellaris* (Abbott) of the Georgia and Carolina coasts; however, the second segment of the abdomen terminates posterolaterally in a thin flat hyaline structure appearing as a barb in front of the costal emargination when viewed from above, thus resembling more nearly the form typical of the eastern Florida coast. No examples from the Bahamas were available for study, but it is probable that they more nearly resemble the Floridan than the Cuban form.

It would, therefore, seem plausible that these insects were carried by an atmospheric disturbance from somewhere near the Bahamas or the east coast of Florida, almost a thousand miles to a tiny dot of land in the great ocean expanse, the island of Bermuda.*

The original home of this genus is probably to be found in the Caribbean, Gulf of Mexico regions, with the greatest diversity of forms being found on the northern coasts of the latter, *T. louisianae*, *T. kanza*, n. sp., *T. calva* (Say), *T. verticalis verticalis* (Fieber), *T. minima* (Abbott), *T. macroceps* (Kirkaldy), *T. naias* (Kirkaldy) and *T. reticulata* (G.-M.), all occurring there.

T. verticalis (Fieber) with its subspecies occurs from the Hudson Bay to the West Indies and from the Californian coast to the Atlantic seaboard, while the closely allied species *T. mendozana* Jaczewski with its subspecies occupies South America east of the Andes.

T. reticulata (G.-M.), as has already been noted, also presents a wide distribution, occupying the shores washed by the Caribbean and Gulf of Mexico. From there it crosses Mexico and Central America to the Pacific, where it is common along the coasts from northern California to Peru, including the islands of the Pacific already mentioned and Shanghai, China. In general it is a coastal form; however, it has been taken in the Imperial Valley region of California, as well as from some hot springs near Silver Peak, Nev. The only record from the interior of the continent is that of a single large male taken at a light, July 20, 1936, in Lawrence, Kan., by L. S. Henderson. It seems likely that this specimen was windborne, possibly from Texas, otherwise, in view of the extensive collecting done by Dr. H. B. Hungerford, Dr. M. E. Griffith, as well as the author and many others, this species would probably have been found in this vicinity since that time. There is the possibility that *T. reticulata* may be an inhabitant of the salt marshes of central Kansas. Additional collecting in this area should prove interesting.

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* Young, F. A. Weather on the Atlantic and Pacific Oceans. Monthly Weather Review, vol. 55, pp. 341-342, July, 1927.

Reference is made to a disturbance of gale velocity in the neighborhood of Bermuda the 2d of July, but no mention of unusual storms in the regions of Florida, however on the 28th and 29th winds of gale force were noted off these coasts.

Unfortunately the original letter written by Mr. Ogilvie is at present unavailable to the author, for if the exact date on which these insects arrived at Bermuda were definite, it would probably be possible to locate their origin by tracing the course of the storm.

Suffice it to say that of the 16 species of the genus, 2 are known only from South America, while 13 are exclusively North American, and 1 species is common to both. For further information see the distributional maps, plates LXI, LXII, LXIII, LXIV, and data concerning species involved.

NOTES ON THE BIOLOGY AND HABITS OF *Trichocorixa*

Ecologically the most interesting thing concerning this genus is the ability of many of its species to live in salt water. In fact it seems likely that at least three, *T. reticulata* (G.-M.), *T. verticalis* (Fieber), and *T. louisianae* Jaczewski, live by preference in more or less saline water. A study of distribution shows the species to be primarily inhabitants of coasts bordering salt water. Even *T. verticalis interiores*, n. subsp., seemingly an exception to the rule, is common only in the high plains and intermountain regions where alkali water and salt water are common. Numerous records state "collected in alkali pond." Unfortunately little or no data has been kept concerning the exact salinity of the water, or the nature of the food sources available. One collecting note in this regard made by the Kansas Biological Survey Party of 1937 is as follows: "Red Deer River, Manitoba, Aug. 5, 1937. Very warm; clear and windy. Where road first comes in sight of Lake Winnipegosis, after river entrance, collected at large salt flat. Took numerous small corixids in salt water, number of large corixids floating dead on surface." These corixids proved to be *T. verticalis interiores.* The presence of the dead larger corixids, as well as the fact that only *T. verticalis interiores* was taken alive in the pool, would indicate the inability of the larger form to live there.

According to Hutchinson (*11*), Albert E. Parr, during fishery investigations in Delaware Bay, obtained two living male specimens of *Trichocorixa verticalis* (Fieber) associated with typical marine planktonic organisms in tow-nettings taken at station 48, north of Brandywine shoals, salinity 24.90 per mille (June 18, 1929) and 63, salinity 29.34 per mille (June 18, 1929), further stating that although drowned flies and other insects were frequently met with in the surface plankton of this region, no specimens of living and apparently healthy insects other than these two corixids were obtained. This would seem very good substantiating evidence for ocean current dispersal already discussed.

In 1932 A. S. Pearse (*28*, pp. 127-141) contributed significantly to our knowledge of the biology of *Trichocorixa verticalis verticalis* and its ability to thrive in saline water. These observations were made on the Dry Tortugas. Specimens collected during this study have been seen and identified as typical *verticalis*. Data on the specimens were as follows:

"Tortugas, Fla. June 7, 1931; pond 2, Bush Key, salinity 2.46." The author found this series of 26 specimens to average the smallest of the species, 3.0 to 3.6 mm.

"Tortugas, Fla. June 24, 1931; pond 1, Long Key, salinity 2 34." These specimens, 8 in number, were the same size as those from Bush Key.

"Tortugas, Fla. June 8, 1931; Garden Key, salinity 1 98." Two specimens of average size, 4 mm.

Dr. Hutchinson also states that he determined as *T. wallengreni* (Stål) [= *T. reticulata* (G.-M.)] a number of specimens sent him by R. M. Bond, taken in "strong brine from salt works at Elkhorn Slough," Monterey County, Calif., November 10, 1930. Both sexes, as well as immature stages, occurred in this locality, which was otherwise inhabited only by the halobionts *Dunanilla, Artemia* and *Ephedra.*

The presence of *Trichocorixa reticulata* (G.-M.) in the desert regions of southern California and Nevada also strongly suggests ability to live in alkali water.

Other than *T. reticulata* (G.-M.) and *T. verticalis* (Fieber), *T. louisianae* Jaczewski and *T. borealis,* n. sp., have been definitely recorded as living in salt water; however, it seems likely that most of the species of this genus can adapt themselves to life in either salt or fresh water.

Trichocorixa reticulata (G.-M.) and *T. verticalis interiores,* n. subsp., have been taken in hot springs by C. T. Brues. The records are as follows:

T. verticalis interiores, n. subsp. "Hot Springs Station, Utah, Hot Spring No. 31, temperature 35.3° C."

T. reticulata (G.-M.). "Additional specimens identical in every way were also taken in cold water flowing away from the spring."

Very little is known concerning the food habits and life histories of the different species. It seems likely that all the species of the genus overwinter as adults. This is known to be true of *Trichocorixa kanza* and *T. calva.* The author has taken large numbers of both these species from beneath the ice in midwinter. A large number of adults of both species were collected April 15, 1941, in a pond located a short distance west of Lawrence, Kan. Large numbers were found living together in water 3 inches deep, chiefly on the leeward side of sweet flag which grew on the northern shore. Eggs were laid immediately after specimens were placed in a laboratory aquarium.

Some females of *T. kanza* were sorted out and placed in another aquarium where they laid eggs on eel grass and stems. These were attached by a suckerlike disk. The egg may be described as follows:

Size.—Diameter .357; height .503 mm.

Shape.—Somewhat variable, depending upon development of embryo within. In general ovoid, tending toward conical at the free end.

Color.—Pearly white when first laid, darkening to yellow. During later development distinct red eye spots present. The surface of the egg presents a hexagonal reticulation under high-power magnification.

So far as is known all species feed on the flocculent bottom ooze, diatoms and algae. The author frequently observed both *T. calva* and *T. kanza* feeding on spirogyra. They did this by means of a curious movement of the forelegs, with which they clasped the filament to the face, moving it along with a hand-over-hand movement, thrusting the stylets into each cell, and sucking out the contents as it passed. One female was observed to withdraw the contents of a strand of spirogyra her own length in 10 seconds.

In the aquarium they were frequently observed to seize their own eggs, pierce them with their stylets and suck them dry, the egg then caving in on one side and appearing cuplike. Whether this occurs in nature is not known.

ECONOMIC IMPORTANCE

Until man has available all knowledge concerning the vastly complex structure of life on this sphere and understands all its causations and manifestations, an exact statement of the importance of any organism or group of organisms to man's economy must necessarily be relative if not ambiguous. Certainly these small insects, so far as is now known, occupy an exceedingly small niche in the economic affairs of man. Yet who is to say what effect the absence of the members of this genus, from our ponds, streams, and lakes and seashores would have on the biology of these waters? Would it be to the benefit or detriment of man? Certainly it does not appear that their absence would be to his benefit.

Members of the genus are frequently found in untold thousands along the shallow shore water, inlets of lakes, and in pools and streams of marshlands. When they occur in such numbers, they must assume considerable importance among the factors governing the biotic balance of these waters; at least in some instances they probably act as a major factor in the transformation of available food sources into a form readily accessible to fish and thence to man.

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* Titles marked with an asterisk do not refer to *Trichocorixa* specifically.

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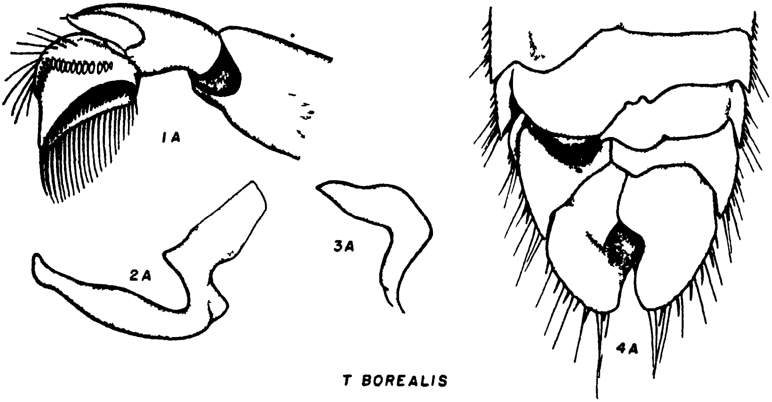
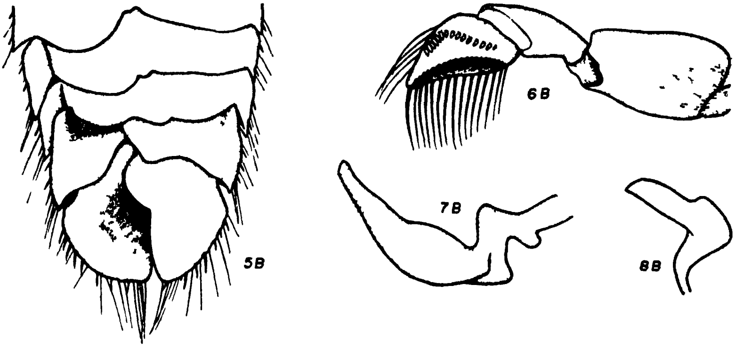
PLATE XLVII

FIG. 1. *Trichocorixa borealis,* pala, ♂.
FIG. 2. *T. borealis,* right clasper, ♂.
FIG. 3. *T. borealis,* left clasper, ♂.
FIG. 4. *T. borealis,* dorsum of abdomen, ♂.
FIG. 5. *T. louisianae,* dorsum of abdomen.
FIG. 6. *T. louisianae,* pala.
FIG. 7. *T. louisianae,* right clasper.
FIG. 8. *T. louisianae,* left clasper.
FIG. 9. *T. kanza,* right clasper.
FIG. 10. *T. kanza,* left clasper.
FIG. 11. *T. kanza,* pala.
FIG. 12. *T. kanza,* dorsum of abdomen.

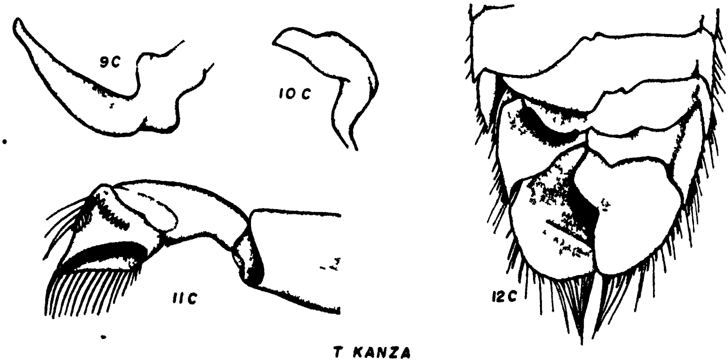
PLATE XLVII



T BOREALIS



T LOUISIANAE

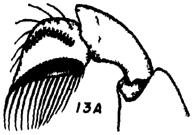


T KANZA

PLATE XLVIII

Fig. 13. *Trichocorixa uhleri,* pala, ♂
Fig. 14. *T. uhleri,* left clasper.
Fig. 15. *T. uhleri,* right clasper.
Fig. 16. *T. uhleri,* dorsum of abdomen.
Fig. 17. *T. arizonensis,* dorsum of abdomen.
Fig. 18 *T. arizonensis,* left clasper.
Fig. 19. *T. arizonensis,* right clasper.
Fig. 20. *T. arizonensis,* pala.
Fig. 21. *T. parvula,* pala.
Fig. 22. *T. parvula,* right clasper.
See text fig 4.
Fig. 23. *T. parvula,* left clasper.
Fig. 24. *T. parvula,* dorsum of abdomen.
Fig. 25. *T. confusa,* right clasper.
Fig. 26. *T. confusa,* left clasper.
Fig. 27. *T. confusa,* pala.
Fig. 28. *T. confusa,* dorsum of abdomen.

PLATE XLVIII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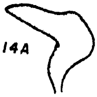
T UHLERI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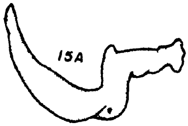
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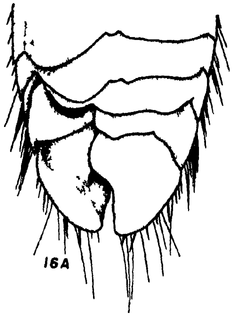
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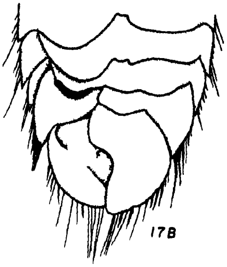
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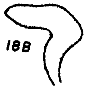
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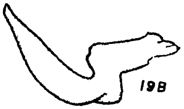
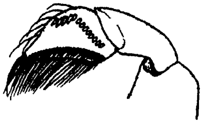

19B

T ARIZONENSIS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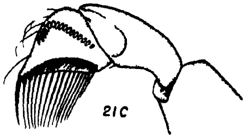
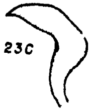
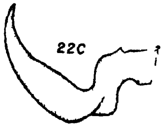
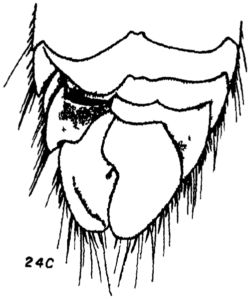
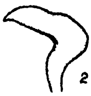

21C

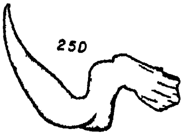
T PARVULA

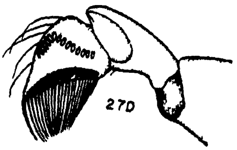

23C


22C


24C


26D


25D


27D

T CONFUSA

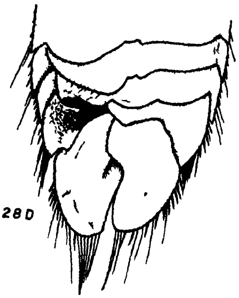
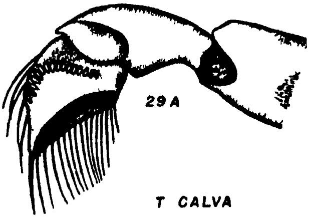
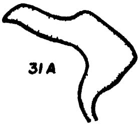

28D

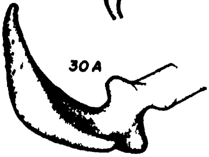
PLATE XLIX

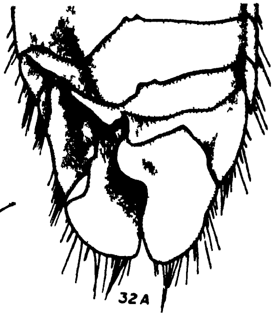
Fig. 29. *Trichocorixa calva,* pala, ♂.
Fig. 30. *T. calva,* right clasper.
Fig. 31. *T. calva,* left clasper.
Fig. 32. *T. calva,* dorsum of abdomen
Fig. 33. *T. orinocoensis,* dorsum of abdomen.
Fig. 34. *T. orinocoensis,* pala, ♂.
Fig. 35. *T. orinocoensis,* right clasper.
Fig. 36. *T. orinocoensis,* left clasper.
Fig. 37. *T. mendozana dar-pomorza,* right clasper.
Fig. 38. *T. mendozana dar-pomorza,* left clasper.
Fig. 39. *T. mendozana dar-pomorza,* pala (redrawn after Jaczewski).
Fig. 40. *T. mendozana mendozana,* right clasper.
Fig. 41. *T. mendozana mendozana,* left clasper.
Fig. 42. *T. mendozana mendozana,* pala, ♂.
Fig. 43. *T. mendozana mendozana,* dorsum of abdomen.

PLATE XLIX

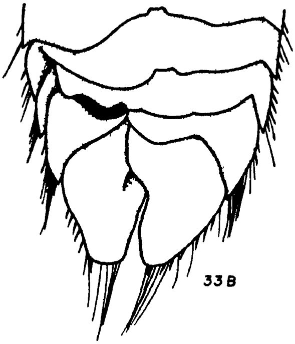

29 A

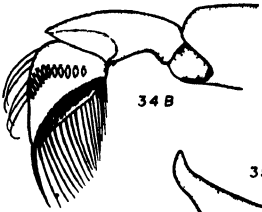

31 A

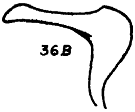

30 A

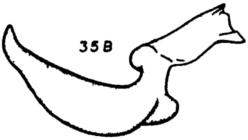

32 A

T CALVA

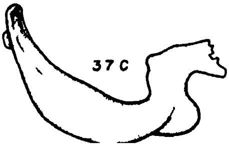

33 B

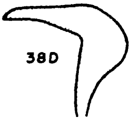

34 B

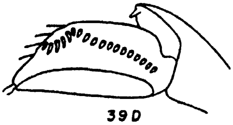

36 B


35 B

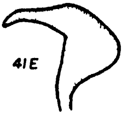
T ORINOCOENSIS

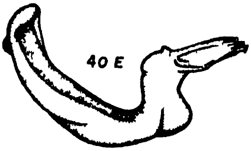

37 C

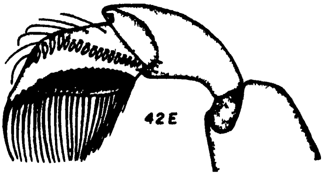

38 D

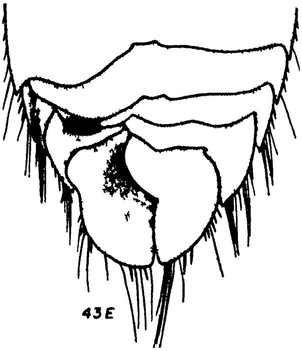

39 D

T MENDOZANA DAR-POMORZA


41 E


40 E


42 E


43 E

T MENDOZANA MENDOZANA

PLATE L

FIG. 44. *Trichocorixa reticulata,* pala, ♂.
FIG. 45. *T. reticulata,* right clasper.
FIG. 46. *T. reticulata,* left clasper.
FIG. 47. *T. reticulata,* dorsum of abdomen.
(Additional figures of structural variation, Pl. VIII.)
FIG. 48. *T. beebei,* dorsum of abdomen.
FIG. 49. *T. beebei,* pala, ♂.
FIG. 50. *T. beebei,* left clasper.
FIG. 51. *T. beebei,* right clasper.
FIG 52 *T. macroceps,* pala, ♂.
FIG. 53. *T. macroceps,* right clasper.
FIG. 54. *T. macroceps,* left clasper.
FIG. 55. *T. macroceps,* dorsum of abdomen.
FIG 56. *T. minima,* pala, ♂.
FIG. 57. *T. minima,* right clasper.
FIG. 58. *T. minima,* left clasper (see figs. 125, 126).
FIG. 59. *T. minima,* dorsum of abdomen.
FIG. 60. *T. naias,* pala, ♂.
FIG. 61. *T. naias,* right clasper.
FIG 62. *T. naias,* left clasper (see figs. 117, 118, 119, 120, 121, 122, 123, 124).
FIG. 63. *T. naias,* dorsum of abdomen.

PLATE L

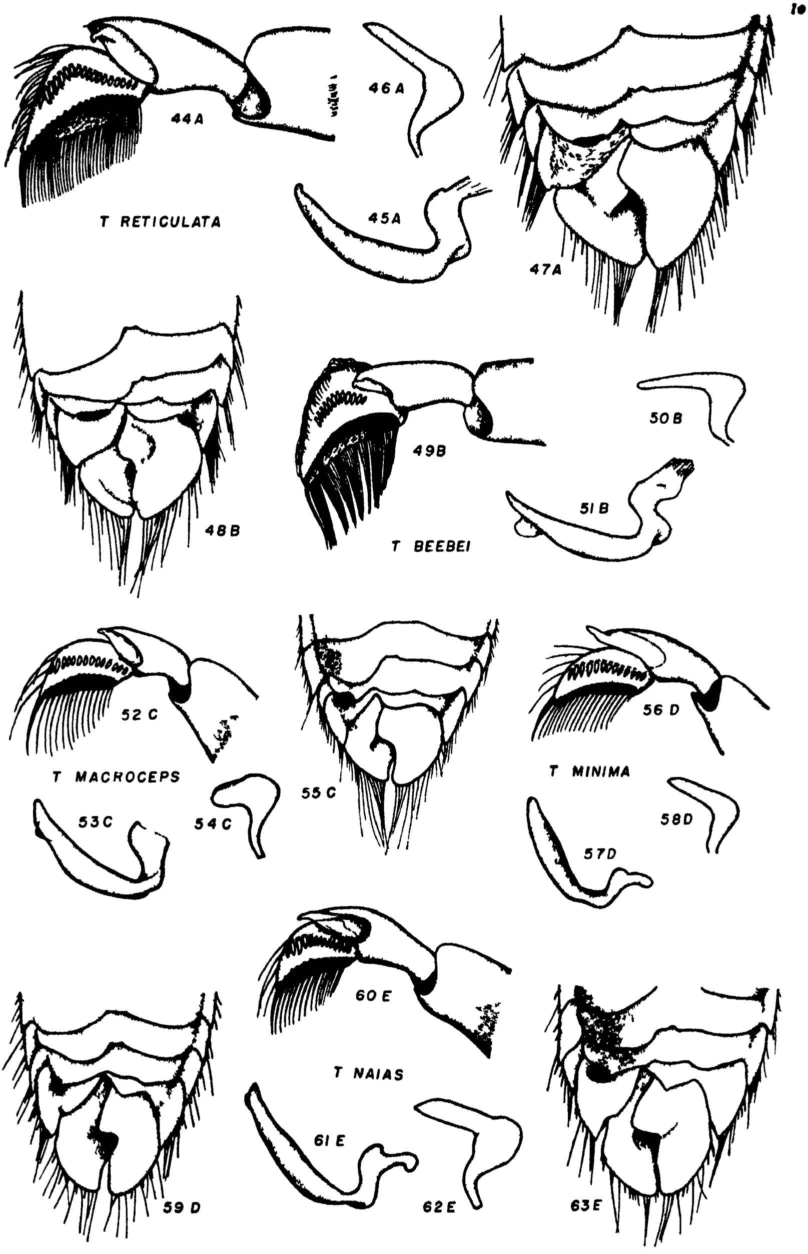

T RETICULATA
T BEEBEI
52 C
T MACROCEPS
56 D
T MINIMA
T NAIAS
59 D
61 E

PLATE LI

FIG. 64. *Trichocorixa verticalis verticalis,* pala, ♂.
FIG. 65. *T. verticalis verticalis,* right clasper.
FIG. 66. *T. verticalis verticalis,* left clasper.
FIG. 67. *T. verticalis verticalis,* dorsum of abdomen.
FIG. 68. *T. verticalis interiores,* dorsum of abdomen
FIG. 69. *T. verticalis interiores,* left clasper.
FIG. 70. *T. verticalis interiores,* right clasper.
FIG. 71. *T. verticalis interiores,* left clasper. (Fallon, Nev.)
FIG. 72. *T. verticalis interiores,* right clasper. (Fallon, Nev.)
FIG. 73. *T. verticalis saltoni,* left clasper.
FIG. 74. *T. verticalis saltoni,* right clasper.
FIG. 75. *T. verticalis californica,* left clasper.
FIG. 76. *T. verticalis californica,* right clasper.
FIG. 77. *T. verticalis* var. *sellaris,* left clasper. (Cold Springs Harbor, N. Y.)
FIG. 78. *T. verticalis* var. *sellaris,* right clasper. (Cold Springs Harber, N. Y.)
FIG. 79. *T. verticalis* var. *sellaris,* left clasper. (Beaufort, N. C.)
FIG. 80. *T. verticalis* var. *sellaris,* right clasper. (Beaufort, N. C.)
FIG. 81. *T. verticalis fenestrata,* left clasper.
FIG. 82. *T. verticalis fenestrata,* right clasper.
FIG. 83. *T. verticalis fenestrata,* dorsum of abdomen.

PLATE LI

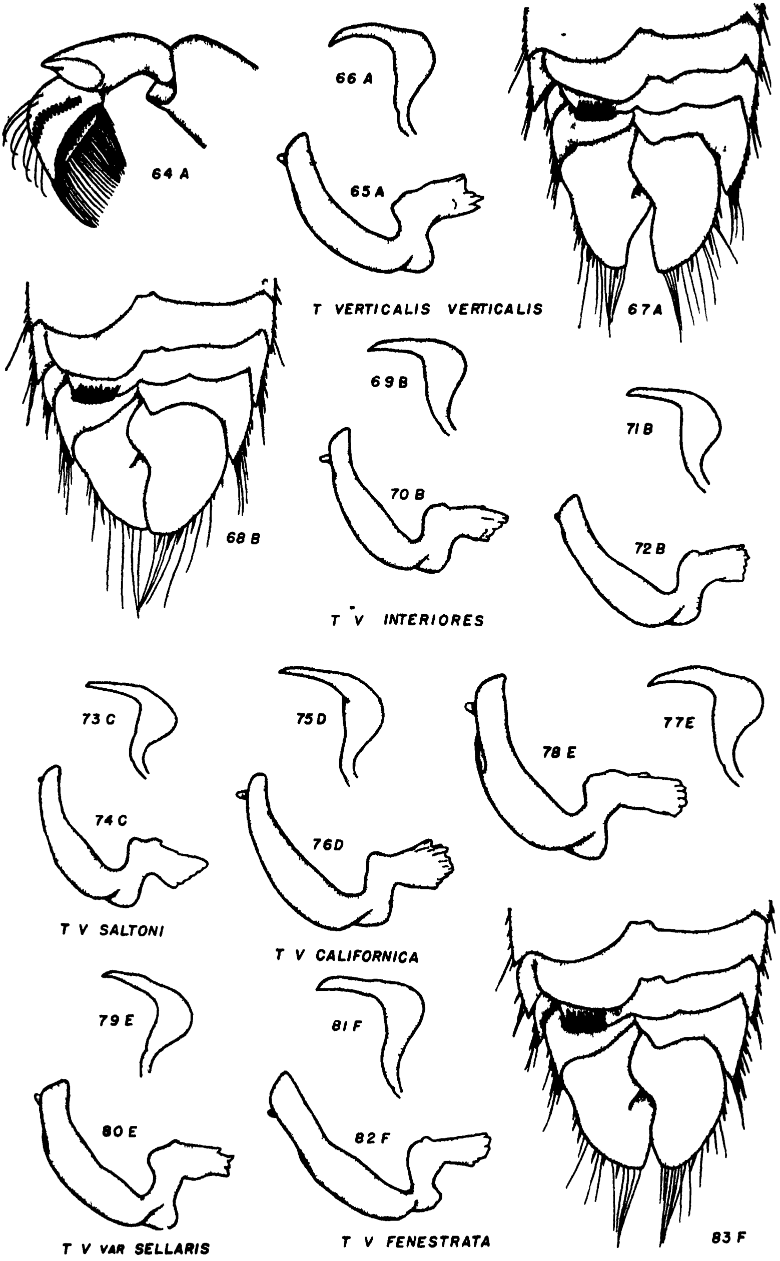

64 A
66 A
65 A
67 A
T VERTICALIS VERTICALIS
68 B
69 B
70 B
71 B
72 B
T V INTERIORES
73 C
74 C
T V SALTONI
75 D
76 D
T V CALIFORNICA
77 E
78 E
79 E
80 E
T V VAR SELLARIS
81 F
82 F
T V FENESTRATA
83 F

PLATE LII

FIG. 84. *Trichocorixa calva,* venter of abdomen, ♀.

FIG. 85. *T. mendozana mendozana,* venter of abdomen, ♀.

FIG. 86. *T. verticalis verticalis,* venter of abdomen, ♀.

FIG. 87. *T. kanza,* venter of abdomen, ♀.

FIG. 88. *T. parvula,* venter of abdomen, ♀.

FIG. 89. *T. confusa,* venter of abdomen, ♀.

FIG. 90. *T. parvula,* head as viewed from above, ♂.

FIG. 91. *T. confusa,* head as viewed from above, ♂.

FIG. 92. *T. uhleri,* head as viewed from in front, ♂.

FIG. 93. *T. arizonensis,* head as viewed from in front, ♂.

FIG. 94. *T. reticulata,* head as viewed from in front, ♂. (Santa Monica, Cal.)

FIG. 95. *T. verticalis verticalis,* head as viewed from in front, ♀.

FIG. 96. *T. verticalis verticalis,* head as viewed from in front, ♀. (Puerto Rico.)

FIG. 97. *T. verticalis verticalis,* head as viewed from in front, ♀.

FIG. 98. *T. verticalis verticalis,* head as viewed from in front, ♀. (Pueblo Nuevo, Matanza, Cuba.)

FIG. 99. *T. verticalis* var. *sellaris,* head as viewed from in front, ♀. (Abbott's holotype, Brunswick, Ga.)

FIG. 100. *T. verticalis* var. *sellaris,* head as viewed from in front, ♀. (Cold Springs Harbor, N. Y.)

FIG. 101. *T. verticalis fenestrata,* head as viewed from in front, ♀.

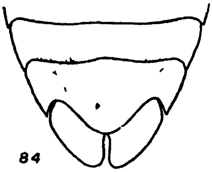
FIG. 102 *T. verticalis interiores,* head as viewed from in front, ♀.

FIG. 103 *T. verticalis interiores,* head as viewed from in front, ♀. (Fallon, Nev.)

FIG. 104. *T. verticalis saltoni,* head as viewed from in front, ♀.

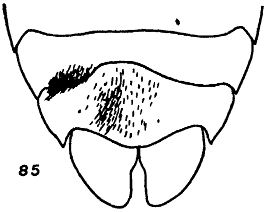
FIG. 105. *T. verticalis californica,* head as viewed from in front, ♀.

PLATE LII



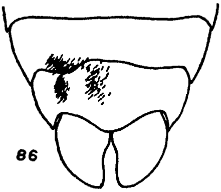
84

T CALVA



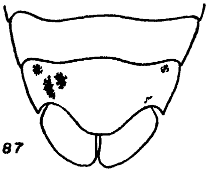
85

T MENDOZANA v MENDOZANA



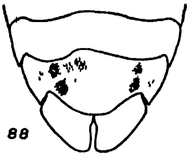
86

T V VERTICALIS



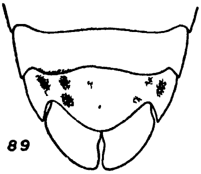
87

T KANZA



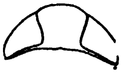
88

T PARVULA

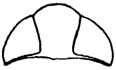


89

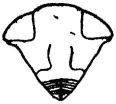
T CONFUSA



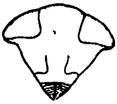
90 T PARVULA



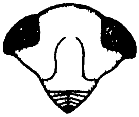
91 T CONFUSA



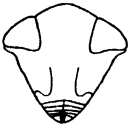
92 T UHLERI



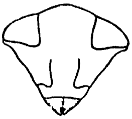
93 T ARIZONENSIS



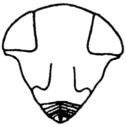
94 T RETICULATA



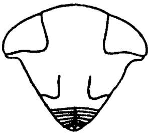
95 A T V VERTICALIS



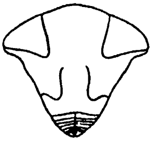
96 A



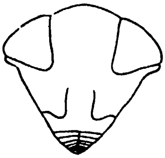
97 A



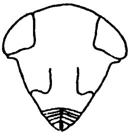
98 A



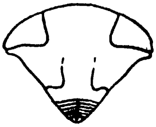
99 B–T V VAR SELLARIS



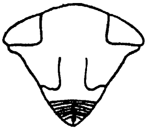
100 B



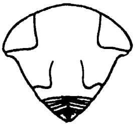
101 T V FENESTRATA



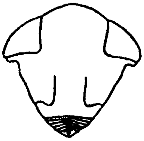
102 C T V INTERIORES



103 C



104 T V SALTONI



105 T V. CALIFORNICA

PLATE LIII

FIG. 106. *Trichocorixa verticalis verticalis,* right clasper. (Cameron County, Tex.)

FIG. 107. *T. verticalis verticalis,* left clasper. (Cameron County, Tex.)

FIG. 108. *T. verticalis verticalis,* right clasper. (Pueblo Nuevo, Matanzas, Cuba.)

FIG. 109. *T. verticalis verticalis,* left clasper. (Pueblo Nuevo, Matanzas, Cuba.)

FIG. 110. *T. verticalis verticalis,* right clasper. (Puerto Rico.)

FIG. 111. *T. verticalis verticalis,* left clasper. (Puerto Rico.)

FIG. 112. *T. macroceps,* left clasper. (Battle Creek, Mich.)

FIG. 113. *T. macroceps,* left clasper. (Staten Island, N. Y.)

FIG. 114. *T. macroceps,* left clasper. (Cold Springs Harbor, N. Y.)

FIG. 115. *T. macroceps,* left clasper. (Boardman, N. C.)

FIG. 116. *T. macroceps,* left clasper. (Macon, Ga.)

FIG. 117. *T. naias,* left clasper. (Redrawn from Hungerford's manuscript sketch of type of *Corixa sexlineata* Champ.)

FIG. 118. *T. naias,* left clasper. (Cardel, 30 miles west of Veracruz, Mexico.)

FIG. 119. *T. naias,* left clasper. (Rio Francisco, Veracruz, Mexico.)

FIG. 120. *T. naias,* left clasper. (Ciudad del Carmen, Campeche, Mexico)

FIG 121. *T. naias,* left clasper. (Ciudad del Carmen, Campeche, Mexico.)

FIG. 122. *T. naias,* left clasper. (Jackson County, Tex.)

FIG. 123. *T. naias,* left clasper. (St. Paul, Minn.)

FIG. 124. *T. naias,* left clasper. (North Branch, Minn.)

FIG. 125. *T. minima,* left clasper. (Hilliard, Fla.)

FIG. 126. *T. minima,* left clasper. (Palpite Ciénaga de Zapute, S. C. Prov., Cuba)

FIG. 127. *T. mendozana dar-pomorza,* strigil. (Redrawn from Jaczewski.)

FIG. 128. *T. mendozana dar-pomorza,* right clasper. (Redrawn from Jaczewski.)

FIG. 129. *T. mendozana dar-pomorza,* left clasper. (Redrawn from Jaczewski.)

FIG. 130. *T. mendozana mendozana,* left clasper. (Redrawn from Jaczewski)

FIG. 131. *T. mendozana mendozana,* right clasper. (Redrawn from Jaczewski.)

FIG. 132. *T. mendozana mendozana,* pala. (Redrawn from Jaczewski.)

FIG. 133. *T. mendozana mendozana,* dorsum of abdomen. (Redrawn from Jaczewski.)

PLATE LIII

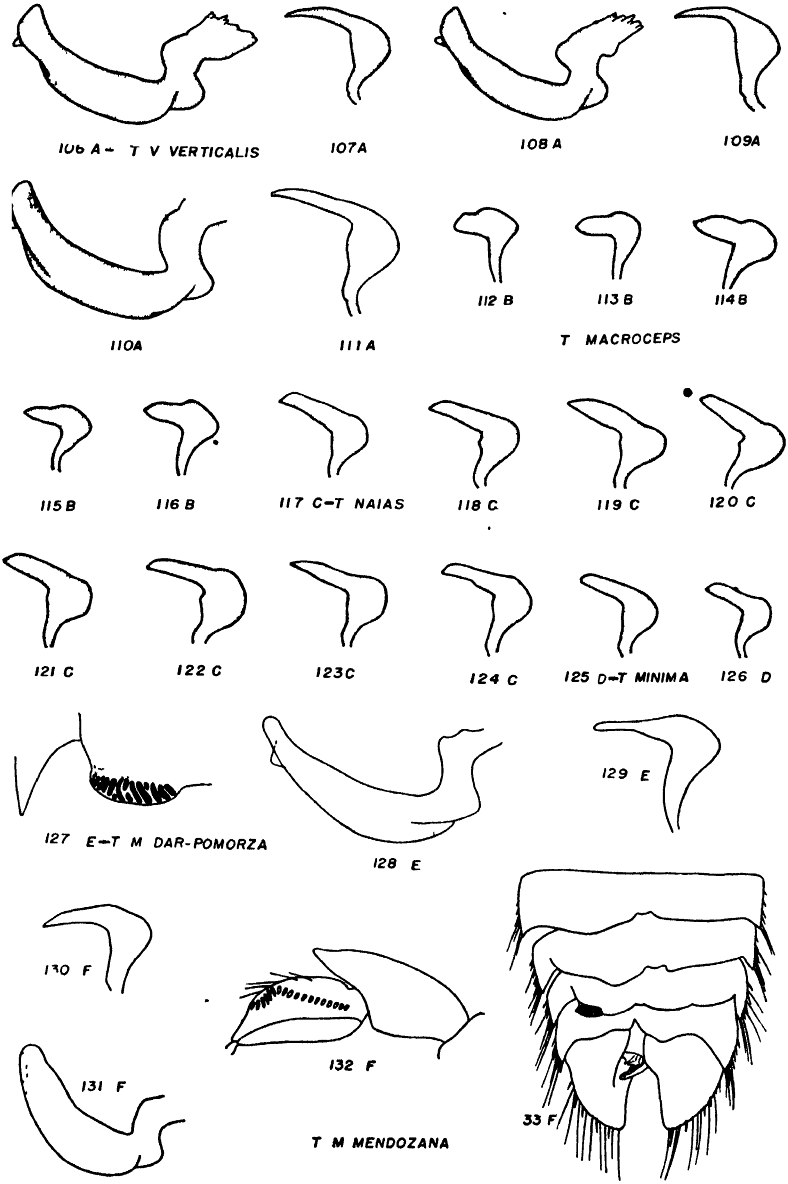
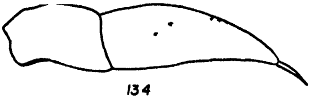

106 A – T V VERTICALIS
107A
108 A
109A
110A
111 A
112 B
113 B
114 B
T MACROCEPS
115 B
116 B
117 C–T NAIAS
118 C
119 C
120 C
121 C
122 C
123C
124 C
125 D–T MINIMA
126 D
127 E–T M DAR-POMORZA
128 E
129 E
130 F
131 F
132 F
T M MENDOZANA
33 F

PLATE LIV

FIG. 134. *Trichocorixa reticulata,* pala, ♀. (Sausalito Alto, Cal.)
FIG. 135. *T. reticulata,* pala, ♀. (Peru.)
FIG. 136. *T. reticulata,* pala, ♀. (Sunset Beach, Cal.)
FIG. 137. *T. reticulata,* pala, ♀ (Santa Monica, Cal)
FIG. 138. *T. reticulata,* pala, ♀. (Santa Monica, Cal.)
FIG. 139. *T. reticulata,* left clasper. (Salton, Cal.)
FIG. 140. *T. reticulata,* right clasper. (Salton, Cal)
FIG. 141. *T. reticulata,* dorsum of abdomen. (Salton, Cal)
FIG. 142. *T. reticulata,* pala, ♂. (Salton, Cal.)
FIG. 143. *T. reticulata,* dorsum of abdomen. (Form described by Stål as *Corixa wallengreni.*)
FIG. 144. *T. reticulata,* left clasper. (Santa Monica, Cal.)
FIG. 145. *T. reticulata,* right clasper. (Santa Monica, Cal)
FIG. 146. *T. reticulata,* pala, ♂. (Santa Monica, Cal.)
FIG. 147. *T. reticulata,* left clasper. (Hawaiian Islands.) (Form described by White as *Corixa blackburni.*)
FIG. 148. *T. reticulata,* right clasper. (Hawaiian Islands)
FIG. 149. *T. reticulata,* pala, ♂. (Hawaiian Islands.)
FIG. 150. *T. reticulata,* dorsum of abdomen. (Hawaiian Islands)

PLATE LIV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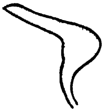
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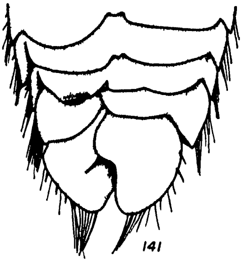
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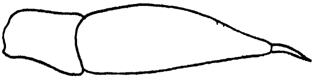
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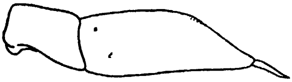
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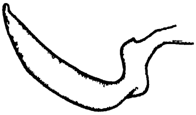
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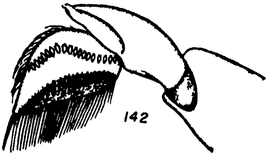
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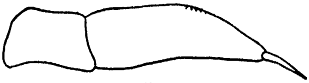
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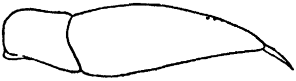
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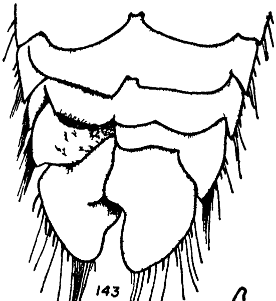
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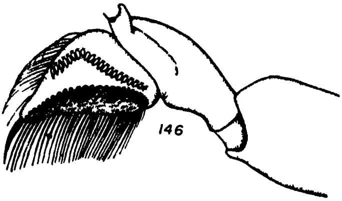
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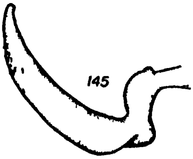
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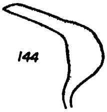
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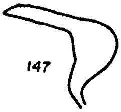
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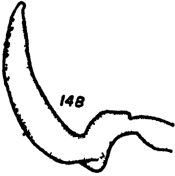
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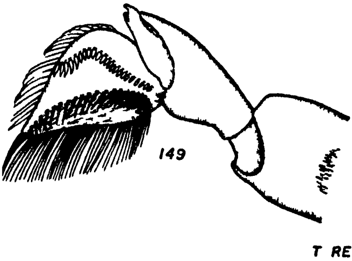
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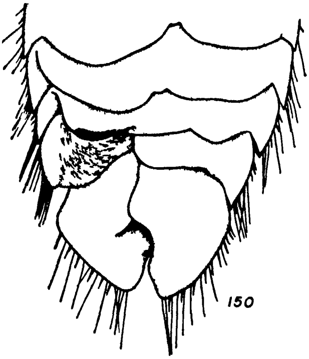
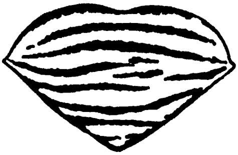

150

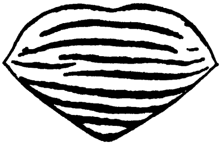
T RETICULATA

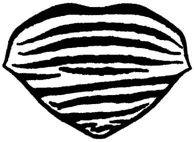
PLATE LV

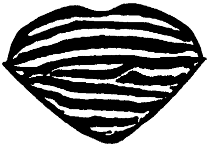
Fig 151. *Trichocorixa borealis*, pronotal disk, ♂.
Fig. 152. *T. kanza*, pronotal disk, ♂.
Fig. 153. *T. calva*, pronotal disk, ♂.
Fig. 154. *T louisianae*, pronotal disk, ♂.
Fig. 155. *T. arizonensis*, pronotal disk, ♂.
Fig. 156. *T. uhleri*, pronotal disk, ♂.
Fig 157. *T. minima*, pronotal disk, ♂.
Fig. 158. *T. macroceps*, pronotal disk, ♂.
Fig. 159. *T. naias*, pronotal disk, ♂.
Fig. 160. *T. parvula*, pronotal disk, ♂.
Fig. 161. *T. confusa*, pronotal disk, ♂.
Fig. 162. *T. orinocoensis*, pronotal disk, ♂.
Fig 163. *T. beebei*, pronotal disk, ♂.
Fig. 164. *T. mendozana mendozana*, pronotal disk, ♂.

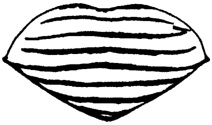
PLATE LV

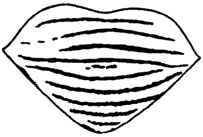

151 T BOREALIS

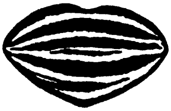

152 T KANZA

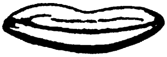

153 T CALVA

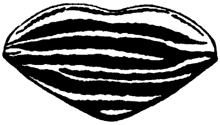

154 T LOUISIANAE

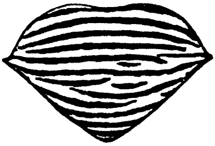

155 T ARIZONENSIS

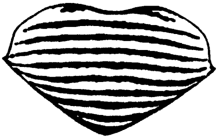

156 T UHLERI

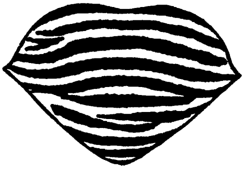

157 T MINIMA

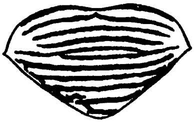

158 T MACROCEPS


T NAIAS 159


160 T PARVULA


161 T CONFUSA


162 T. ORINOCOENSIS


163 T BEEBEI

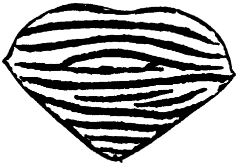
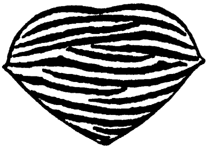

164 T M MENDOZANA

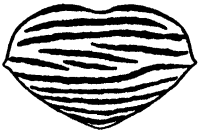
PLATE LVI

Fig. 165. *Trichocorixa verticalis verticalis*, pronotal disk, ♂. (Norfolk, Va.)
Fig. 166. *T. verticalis verticalis*, pronotal disk, ♂. (Cameron County, Tex.)
Fig. 167. *T. verticalis* var. *sellaris*, pronotal disk, ♂. (Cold Springs Harbor, N. Y.)
Fig. 168. *T. verticalis californica*, pronotal disk, ♂.
Fig. 169. *T. verticalis saltoni*, pronotal disk, ♂.
Fig. 170. *T. verticalis fenestrata*, pronotal disk, ♂.
Fig. 171. *T. verticalis interiores*, pronotal disk, ♂. (Fallon, Nev.)
Fig. 172. *T. reticulata*, pronotal disk, ♂. (Cuba.)
Fig. 173. *T. reticulata*, pronotal disk, ♂. (Santa Monica, Cal.)
Fig. 174. *T. reticulata*, pronotal disk, ♂. (Silver Peak, Nev.)
Fig. 175. *T. reticulata*, pronotal disk, ♀. (Salton, Cal.)
Fig. 176. *T. reticulata*, pronotal disk, ♂. (Salton, Cal.)
Fig. 177. *T. reticulata*, pronotal disk, ♂. (Silver Peak, Cal.)
Fig. 178. *T. reticulata*, pronotal disk, ♂. (Hawaiian Islands.)

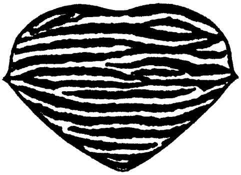
PLATE LVI



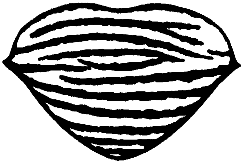
165 A-T V VERTICALIS



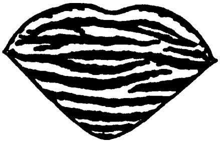
166 A



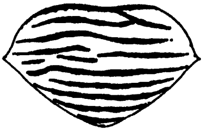
167 T V VAR SELLARIS



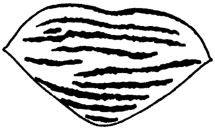
168 T V CALIFORNICA



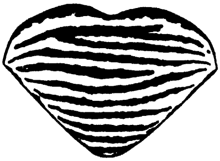
170 T V FENESTRATA



169 T V SALTONI



171 T V INTERIORES



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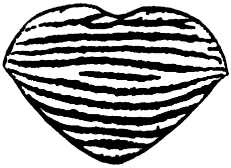
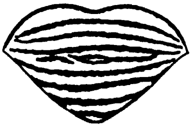


172 T RETICULATA



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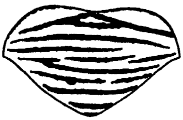

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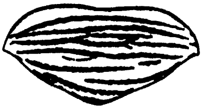

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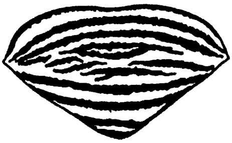

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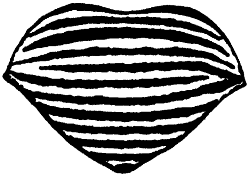


178

PLATE LVII

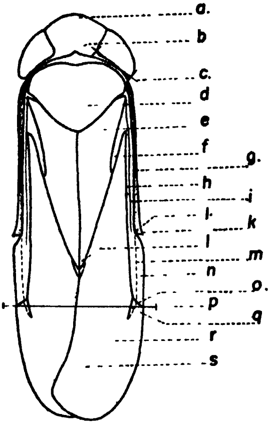
Fig. 179. Dorsal view of female *Trichocorixa* (*T. verticalis verticalis*).
Fig. 179a. Vertex.
Fig. 179b. Synthlipsis.
Fig. 179c. Width of eye along hind margin.
Fig. 179d. Pronotal disk.
Fig. 179e. Clavus.
Fig. 179f. Pruinose area along claval fold.
Fig. 179g. Costal margin of hemelytron.
Fig. 179h. Vein Cu.
Fig. 179i. Vein M.
Fig. 179j. Emargination of costal margin of hemelytron
Fig. 179k. Posterolateral apex of second abdominal segment (barblike here)
Fig. 179l. Apex of clavus.
Fig. 179m. Embolar groove, anterior pruinose area of.
Fig. 179n. Polished portion of costal margin anterior to nodal furrow
Fig. 179o. Nodal furrow.
Fig. 179p. Line produced through costal margins at the nodal furrow.
Fig. 179q. Embolar groove, posterior pruinose area of.
Fig. 179r. Apical portion of corium.
Fig. 179s. Membrane.

Fig. 180. *T. minima,* hemelytron of female. (Unfortunately, the labels on the plate were reversed.)

Fig. 181. *T. macroceps,* hemelytron of female. (Unfortunately, the labels on the plate were reversed.)

Fig. 182. *T. naias,* hemelytron of female.
Fig. 183. *T. mendozana mendozana,* hemelytron of female.
Fig. 184. *T. orinocoensis,* hemelytron of female.

PLATE LVII



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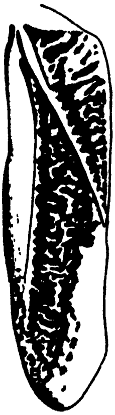
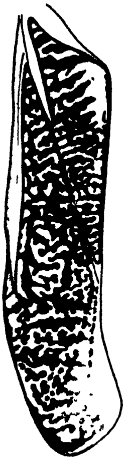
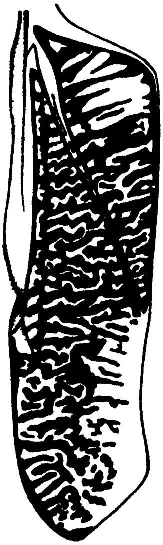


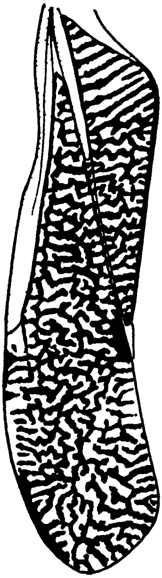
181 T. MINIMA



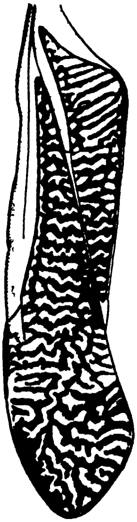
180 T MACROCEPS



182. T. NAIAS



183. T M. MENDOZANA

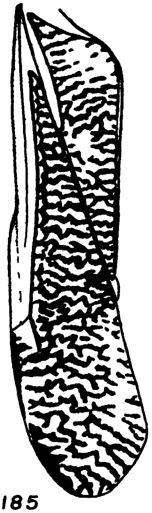


184. ORINOCOENSIS

PLATE LVIII

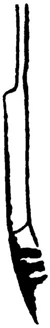
FIG. 185. *Trichocorixa confusa,* hemelytron of ♀.
FIG. 186 *T. parvula,* hemelytron of ♀.
FIG. 187. *T. louisianae,* hemelytron of ♀.
FIG. 188. *T. louisianae,* prenodal polished portion of costal margin, ♀. (Wakulla, Fla)
FIG. 189 *T. louisianae,* prenodal polished portion of costal margin, ♀. (Río Canimar, Central Matanzas, Cuba.)
FIG. 190. *T. borealis,* hemelytron of ♀.
FIG. 191. *T. kanza,* hemelytron of ♀.
FIG. 192. *T. calva,* hemelytron of ♀.

PLATE LVIII

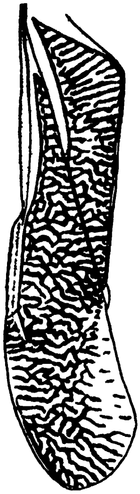


185

T CONFUSA

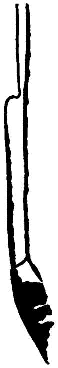


188 A

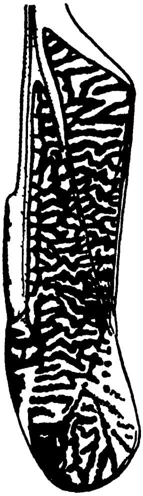


186

T. PARVULA

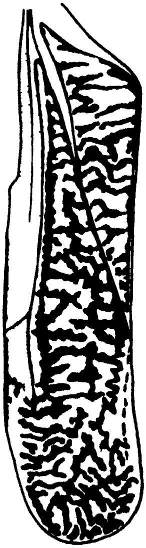


189 A.

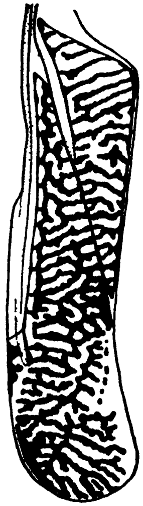


187 A

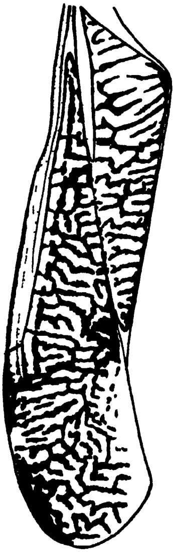
T LOUISIANAE



190. T. BOREALIS



191. T. KANZA

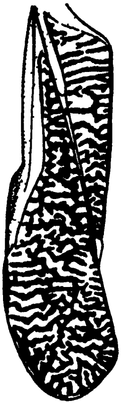


192. T. CALVA

PLATE LIX

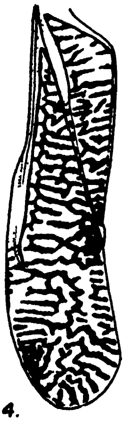
FIG. 193 *Trichocorixa beebei*, hemelytron of ♀.
FIG. 194. *T. arizonensis*, hemelytron of ♀.
FIG. 195 *T. uhleri*, hemelytron of ♀.
FIG. 196. *T. reticulata*, hemelytron of ♀. (Salton, Cal.)
FIG. 197. *T reticulata*, hemelytron of ♀. (Cuba)
FIG. 198. *T. reticulata*, hemelytron of ♀. (Hawaii.)
FIG. 199. *T. reticulata*, hemelytron of ♀. (Santa Monica, Cal)

PLATE LIX



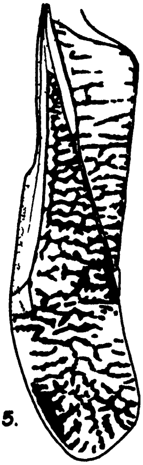
193.

T. BEEBEI



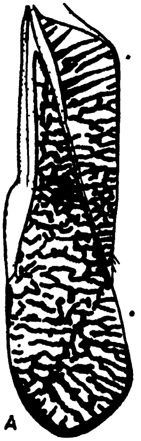
194.

T. ARIZONENSIS



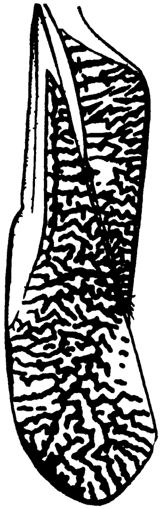
195.

T. UHLERI

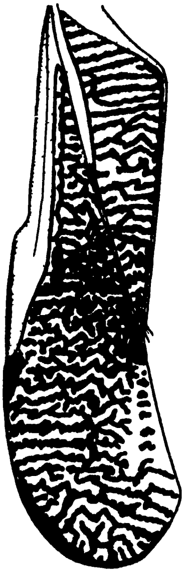


196. A

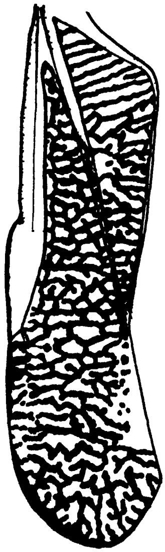
T. RETICULATA



197 A.



198 A.



199 A.

PLATE LX

Fig. 200 *Trichocorixa verticalis verticalis,* hemelytron of ♀ (Norfolk, Va.)

Fig. 201. *T. verticalis interiores,* costal margin of ♀. (Eastland County, Tex.)

Fig. 202. *T. verticalis interiores,* costal margin of ♀. (Fallon, Nev.).

Fig. 203 *T. verticalis fenestrata,* hemelytron of ♀

Fig. 204. *T. verticalis verticalis,* costal margin of ♀ (Pueblo Nuevo, Matanzas, Cuba.)

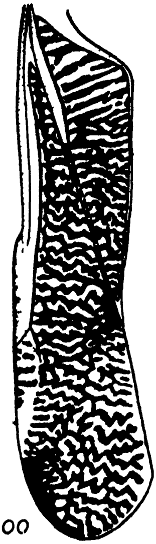
Fig. 205. *T. verticalis* var. *sellaris,* costal margin of ♀. (Cold Springs Harbor, N. Y.)

Fig. 206. *T. verticalis* var. *sellaris,* costal margin of ♀. (Paratype, Brunswick, Ga.)

Fig. 207. *T. verticalis saltoni,* costal margin of ♀. (Holtville, Cal.)

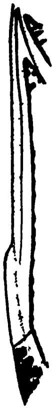
Fig. 208. *T. verticalis californica,* costal margin of ♀. (Eureka, Cal.)

PLATE LX

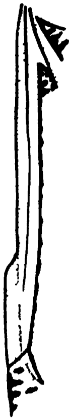


200

T V VERTICALIS

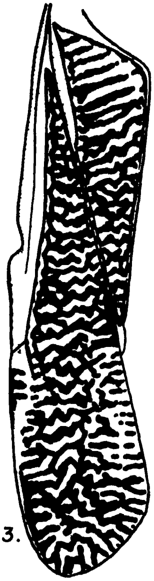


201 A



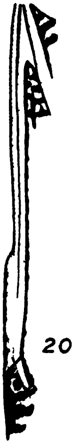
202 A.

T. V. INTERIORES



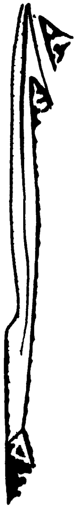
203.

T. V FENESTRATA

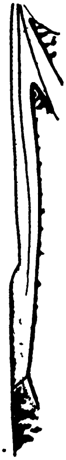


204.

T. V, VERTICALIS

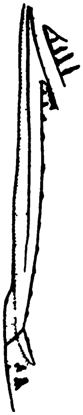


205 B.



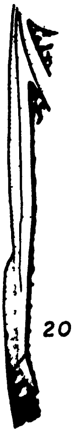
206 B.

T V. var. SELLARIS



207

T V.SALTONI



208.

T. V. CALIFORNICA

PLATE LXI

FIG. 209 Distribution of

1. *Trichocorixa reticulata* (G.-M.).
2. *T. beebei*, n. sp.
3. *T. mendozana* Jaczewski.
   T. mendozana mendozana Jaczewski.
   T. mendozana dar-pomorza Jaczewski.
4. *T. orinocoensis*, n. sp.

PLATE LXI

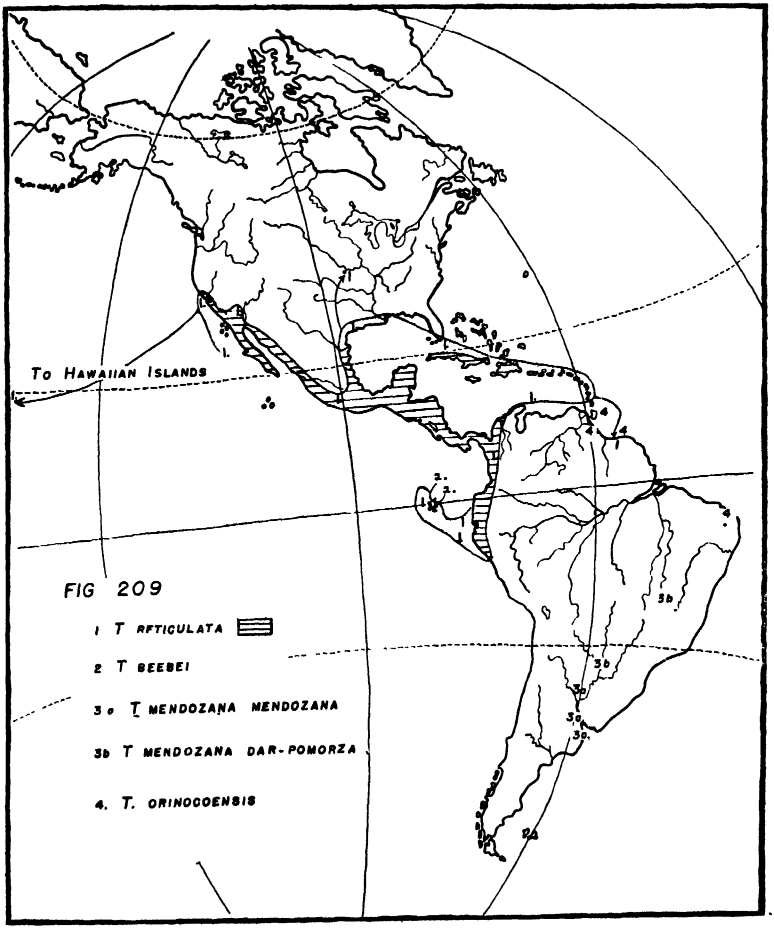


FIG 209

PLATE LXII

FIG. 210. Distribution of

5. *Trichocorixa verticalis* (Fieber).
   - a. *T. verticalis verticalis* (Fieber).
   - b. *T. verticalis* var *sellaris* (Abbott).
   - c. *T. verticalis interiores*, n subsp.
   - d. *T. verticalis fenestrata* Walley.
   - e. *T. verticalis californica*, n. subsp.
   - f. *T. verticalis saltoni*, n. subsp.

PLATE LXII

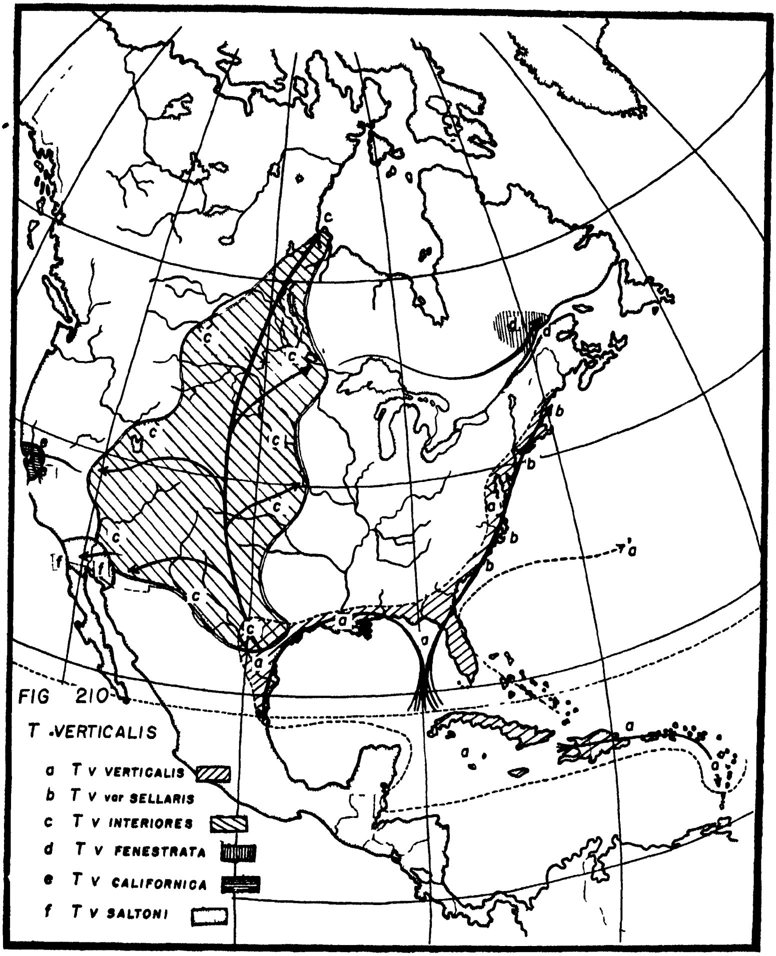


FIG 210
T. VERTICALIS
a T V VERTICALIS
b T V var SELLARIS
c T V INTERIORES
d T V FENESTRATA
e T V CALIFORNICA
f T V SALTONI
a
b
c
d
e
f

PLATE LXIII

FIG. 211. Distribution of

6. *Trichocorixa macroceps* (Kirkaldy).
7. *T. louisianae* Jaczewski.
8. *T. arizonensis*, n. sp.
9. *T* *confusa*, n. sp.
10. *T. calva* (Say).

PLATE LXIII

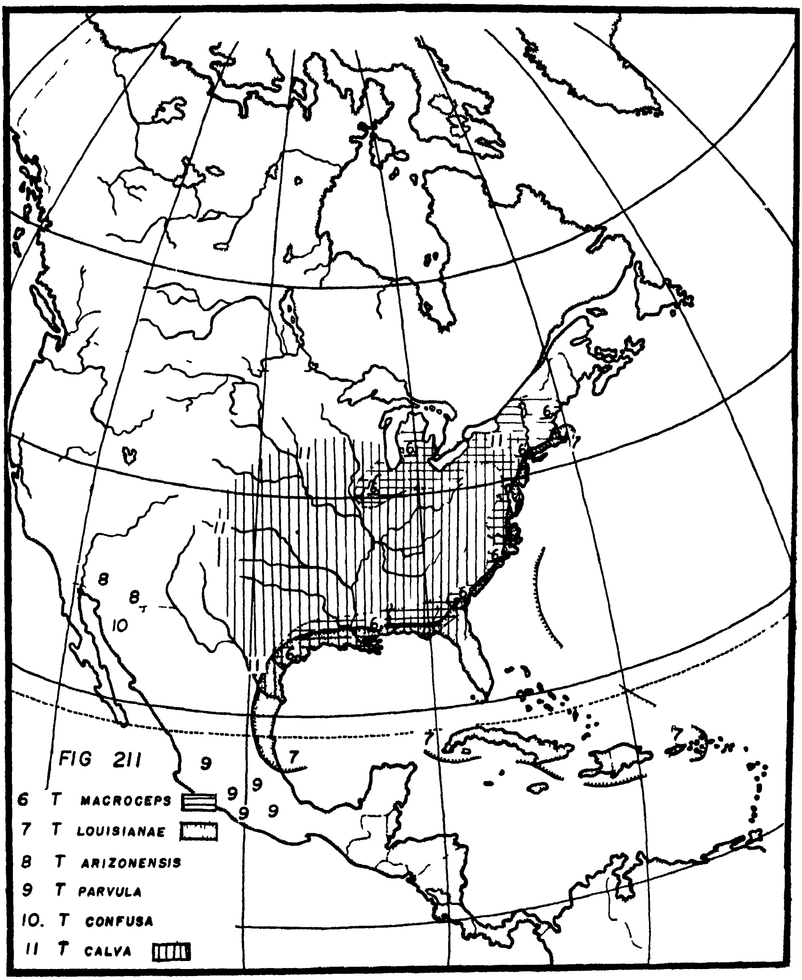


FIG 211

PLATE LXIV

FIG. 212 Distribution of
12. *Trichocorixa naias* (Kirkaldy).
13. *T. kanza*, n. sp.
14. *T. borealis*, n. sp
15. *T. uhleri*, n. sp.
16. *T. minima* (Abbott).

PLATE LXIV

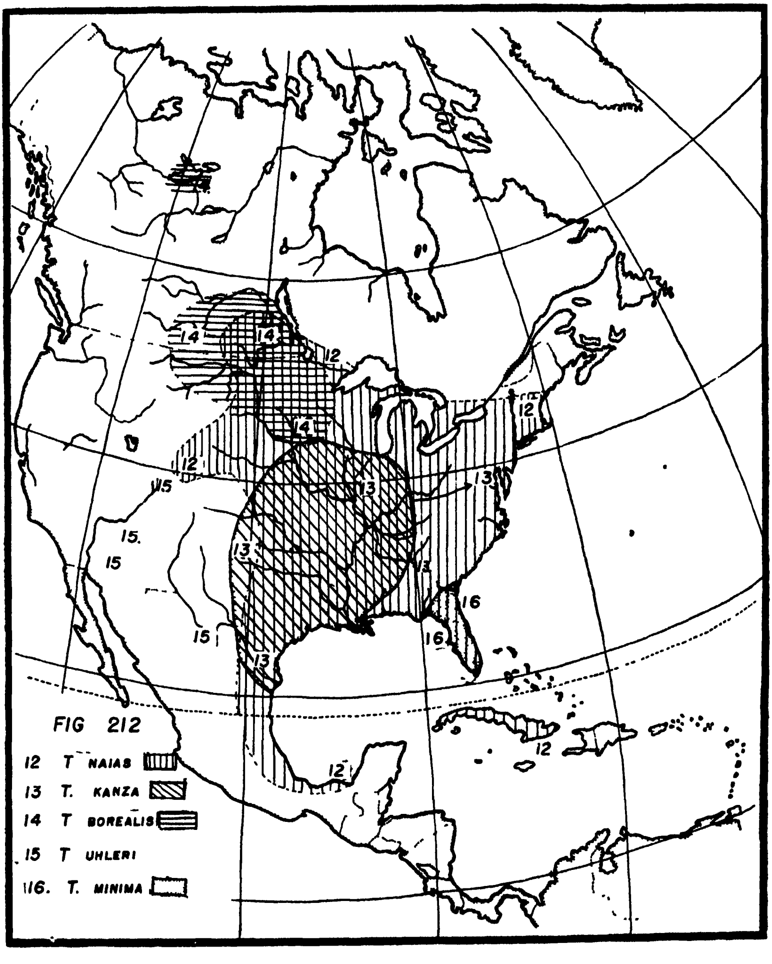

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FIG 212
12 T NAIAS ▥
13 T. KANZA ▧
14 T BOREALIS ▤
15 T UHLERI
16. T. MINIMA ⬚

Pseudocorixa Jaczewski

1931. Jaczewski, T. Annales Musei Zoologici Polonici, Tom IX, Nr. 15, p. 220 (New genus for *Corixa guatemalensis* Champion, which is the genotype.)

1936. Poisson, R. Archiv. de Zool. Exp. et Gén. LXXVII, p 458.

In characterizing this new genus Doctor Jaczewski gives the following: "Abdominal asymmetry in the males sinistral. Genital armature of the males directed leftwards. Strigil present. Front tibiae of males thickened apically but not produced triangularly over the base of the pala. Pala with two rows of stridulatory pegs, one of them (the inner one) continued by a row of unmodified bristles. Pronotal disk, clavus and base of corium rastrated. Membranal suture marked by an oblique pale stripe. Lateral lobes of the prothorax tongue-like, rounded at the apex.

"Generic Type: *Pseudocorixa guatemalensis* (Champion) = *Corixa guatemalensis* Champion, 1901.

"The proposed new genus differs from all other genera of *Corixidae* with sinistral abdominal asymmetry in the males by the characters offered by the structure of the front tibiae and palae of the males. From *Trichocorixa* Kirk., *Trichocorixella* gen. n. and *Heliocorisa* Lundbl. it is easily separated, besides the above, by the pattern of the hemelytra which shows a pale oblique stripe between corium and membrane. From *Corixa* Geoffr. it differs also by the shape of the lateral lobes of the prothorax, and from *Neocorixa* Hung. by the presence of a well developed strigil.

"The sinistral species *'Corixa' williamsi* Hung., from Ecuador, does not seem to belong to *Pseudocorixa* gen. n., but I am unable to say at present anything definite concerning its generic position."

Since we have before us three species that are very near relatives of *Pseudocorixa guatemalensis*, all of them with dextral males, it seems advisable to revise the original description of the genus. While in most generic groups the males of all species are either all dextral or all sinistral, here is a group of species that must be congeneric in spite of the fact that the males of one species are sinistral and those of the other species are dextral. When we bear in mind that in certain species of Corixidae, such as *Krizousacorixa femorata* (Guér.) for example, frequent cases of reversal are found, it is not strange to find species of opposite symmetry within a genus.

All of the species we assign to *Pseudocorixa* fit the following description:

Short, compact species. Head as seen from above short. Postocular space narrow except at inner angle. Subocular space narrow. Face nearly glabrous. Facial impression of male not usually very strong. Pronotum short and broadly rounded behind. Pronotal disk, clavus and base of corium rastrate; distal half of corium shiny, often semihyaline, with pattern partially effaced. In well pigmented specimens the membranal suture of the right hemelytron may be marked by a pale line but the membrane of the left hemelytron always has the pattern effaced. Embolar area broad. The pruinose area of the embolar groove posterior to the nodal furrow short, not more than 3/7 the length of the cubital ridge and shorter than the pruinose area along the claval suture.

Lateral lobe of the pronotum linguiform. Metaxyphus elongate. Anterior tibia with an apical comb of spines. A little more than half of the under side of the hind femur pubescent. Asymmetry of male, sinistral in one species, dextral in four species. Strigil present. The lobes of the eighth abdominal segment of male nearly normal. The anterior tibia of the male produced on outer distal margin. The male pala has longer pegs in distal end of the row and there are some pegs in the upper palmar row of bristles, the distal bristles stout. Middle femora of both sexes with a longitudinal groove on the ventral surface, except in *P. conata* (Hungerford) and possibly in *P. ocotlanensis* (Jacz.).

Comparative notes: This genus is nearest to *Morphocorixa* Jacz., from which it differs in possessing a strigil, in having nearly normal lobes of the eighth abdominal segment, and in having a longitudinal groove on the ventral surface of the middle femur in three and possibly four of the five species.

Distribution: Southwestern United States south to Guatemala.

The following key will separate the species:

1. Males 2
Females* 6
2 (1) Males dextral 3
Males sinistral. Pala and genitalia as on Plate LXV
P. guatemalensis (Champ.)
(see p. 410)
3 (2) Strigil at end of a long pedicle . . . . *P. conata* (Hungerford)
(see p. 414)
Strigil not at end of a long pedicle 4
4. (3) Fifth abdominal tergite with a prestrigilar tuft of stiff hairs 5
Fifth abdominal tergite without a prestrigilar tuft of stiff hairs.
P. beameri (Hungerford)
(see p. 411)
5. (4) Median lobe of seventh abdominal segment broadly rounded
P. beameroidea (Hungerford)
(see p. 413)
Median lobe of seventh abdominal segment not broadly rounded
P. ocotlanensis (Jaczewski)
(see p. 416)

---

* No females of *P. ocotlanensis* are known

6. (1) With only the claw of middle leg extending beyond tip of the abdomen........ 7
With at least half of the tarsus of the middle leg extending beyond tip of abdomen 8
7. (6) Basal half of corium moderately rastrate.. ....*P. beameri* (Hungerford) (see p. 411)
Basal half of corium only faintly rugulose ....*P. guatemalensis* (Champ.) (see p. 410)
8. (6) With distal end of middle tibia attaining tip of abdomen. *P. conata* (Hungerford)**
With the tarsus of the middle leg extending for half its length beyond tip of abdomen ....*P. beameroidea* (Hungerford) (see p. 413)

Pseudocorixa guatemalensis (Champion)

(Plate LXV, three figs.; wash drawing No. 9, Pl. IV)

1901. *Corixa guatemalensis* Champion, G. C. Biol. Centr.-Amer. Rhynch., Vol. II, p. 377, Tab. 22, figs. 19, 19a, 19b.

1901 *Arctocorisa guatemalensis*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Proc. Ent. Soc. Washington, X, p. 195.

1928. *Corixa guatemalensis*, Hungerford, H. B. Annals Ent. Soc. Amer., XXI, p. 144, Pl. VIII, fig. 5.

1931. *Pseudocorixa guatemalensis*, Jaczewski, T. Annales Musei Zoologici Polonici, Tom. IX, Nr. 15, p. 221-223, Pl. XXVIII, figs. 52-58; Pl. XXIX, fig. 68.

Size: Length 5.5 mm. to 5.75 mm. Width of head 1.78 mm. to 1.99 mm.

Color: General facies typically dark. The pronotum crossed by 7 or 8 brown bands, the last one on the caudal margin. The hemelytral pattern not contrasting, often indistinct; basal brown lines of clavus usually entire. Distal ones furcate. Those of corium undulate, furcate and here and there connected. Usually effaced from the distal angle of the corium and on the membrane. Embolar groove usually brown to black. Venter and legs unusually pale for so dark a bug.

Structural characteristics: Head, viewed from above, about half as long as the pronotal disk. Facial impression of the male distinct but not very strong, rather narrow, scarcely touching laterally the inner margins of the eyes. Frontal arch not prominent. Fourth segment of antenna 45.2% of the length of the third. Pronotal disk nearly twice as wide as long without a discernible median keel. Lateral angles nearly truncated, widely rounded in front, with a small pointed angle posteriorly. The front leg of male as shown on Plate LXV. Two rows of stridulatory pegs on the pala, the upper one with about 18 pegs, the distal ones longest. The lower row of 4 pegs in the upper palmar row of bristles terminating it before the middle of the pala. After an interval the palmar row continues as

---

** Although we have no females of *P. conata*, it is reasonable to suppose that the female of this species would agree on this character with the males since the males and females of the other species agree.

stout, somewhat shortened, bristles. The distal end of the middle tarsus barely reaching the tip of the abdomen. Jaczewski gives the following leg measurements: Middle leg: Femur : tibia : tarsus : claws :: 100 : 45.1 : 31.7 : 34.7. Hind leg : Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100.9 : 111.8 : 60. The hind femora armed with very few isolated spines, both on the upper and lower side. Abdominal asymmetry of the male sinistral. The strigil with about 7 combs, situated on a short pedicle and rather remotely from the lateral margin of the tergite. The genital capsule as shown on Plate LXV.

Location of types: In the British Museum. Six specimens taken near Guatemala City. These have been examined by Hungerford and by Jaczewski.

Comparative notes: The sinistral males separate this species from the other species that have the same shape and general facies.

Data on distribution: (Plate XC.) Described from Guatemala by Champion. Reported by Jaczewski from Colima, Mexico, Aug. 20, 1929, 1 male, 2 females from "a large temporary pool on a country road, no aquatic plants." We have in the University of Kansas collection the following from MEXICO: State of México, Lerma, May 15, 1930, Creaser and Gordon, 1 female; State of México, Tejupilco, Dist. of Temascultepec, Alt. 1,340 meters, June-July, 1933, H. E. Hinton, 2 males, 13 females; same place June 22, 1933, R. L. Usinger, 1 male; Río Amacuza, Morelos, Kil. 133 S. México City, October 14, 1936, H. D. Thomas, 15 males, 24 females.

Pseudocorixa beameri (Hungerford)

(Plate LXV, 2 figs ; Plate LXVI, 1 fig.)

1928. *Arctocorixa beameri* Hungerford, H. B Annals Ent Soc America, XXI, p. 142, Pl. IX, figs 7 and 9

1933 *Sigara beameri*, Jaczewski, T Annales Musei Zoologici Polonici, Tom IX, Nr 21, p. 335.

1938 *Arctocorixa beameri*, Hungerford, H B Pan-Pacific Entomologist XIV, p 76. (Reports it from Mexico.)

1939 *Sigara beameri*, Hungerford, H. B. Jl. Kansas Ent Soc., XII, p 123, fig p 125

Size: Length 5.25 mm. to 6 mm.; width across the head 1.9 mm. to 2.24 mm. Males usually a little smaller than the females.

Color: General facies dark brown, the pale lineations not conspicuous. About seven pale bands on pronotum, those of hemelytra more or less effaced, the lighter figures very broad, yet so dark that the general effect is dark. Embolar groove brown. Venter dark brown to black.

Structural characteristics: Head, viewed from above, about half as long as the pronotal disk. Interocular space slightly greater than eye width in female. Rear margin of head roundly produced. Pronotum short, the disk not quite half as long as broad, the rear margin broadly rounded. Surface of pronotum and base of hemelytra somewhat rastrate and entire dorsal surface pebbled except the membrane which is smooth and hyaline. Legs short and stout. The front leg of the male as shown in Plate LXVI. The tibia expanded into a plate above that is tipped by a spine; a strong comb of bristles at the distal base; the pala thin, a row of about 14 pegs above the middle of the inner face, the distal pegs longer. Another row of 3 or 4 pegs ending the basal row of upper palmar bristles. Beyond this interruption and at a higher level is a row of about 9 stout spines. The tip of the middle tarsus not much surpassing the tip of the abdomen.

The comparative lengths of the leg segments as follows: Middle leg—femur : tibia : tarsus : claws :: 100 : 48.3 : 34.5 : 41.4. Hind leg—femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100 : 106 : 50. Hind femora with eight or more stout spines beneath. Metaxyphus long and slender. Odoriferous gland pores, prominent and guarded by several strong spines. Some of these may be matted together to form a very broad, flat plate that tapers from a broad base to a pointed tip. The male dextral, the strigil is small, round, sessile, of five longitudinal combs, the outer and inner one, of course, very short. The genital capsule of the male as shown on Plate LXV.

Comparative notes: The similarity of this species to Champion's *guatemalensis* in general facies, form and palar characters was not noticed at the time it was described. Jaczewski says his *S. ocotlanensis* is a near relative.

Location of types: Described from five specimens (3 males and 2 females) taken by Doctor R. H. Beamer, Cochise County, Arizona, July 29, 1927. Holotype, allotype and paratype in the Francis Huntington Snow Entomological Collections of the University of Kansas.

Data on distribution: (Plate XC.) To date, the only United States record is that of the types taken in *Arizona.* We have the following from MEXICO: Juan Manual, near El Salto, 9,300 ft. above sea level in Pine Forest region, June 5, 1937, Meldon Embury, 10 males, 17 females (State of *Durango*); *Michoacán,* Morelia, September 4, 1938, H. D. Thomas, 1 male, 5 females; *Michoacán,* Patzcuaro, August 31, 1938, H. D. Thomas, 1 male, 1 female; *Jalisco,* Tecolotlan, September 15, 1938, H. D. Thomas, 2 females.

Pseudocorixa beameroidea (Hungerford)

(Plate LXVI, 3 figs.)

1939. *Sigara beameroidea* Hungerford, H. B. Jl Kansas Ent. Soc. XII, pp. 123-124, 8 figs. p. 125.

Size: Length 5.25 mm. to 5.88.; width across the head 1.89 mm. to 2 mm. A fairly short, compact species.

Color: General facies as in *P. beameri* (Hungerford), the pale lineations not conspicuous. About eight pale bands on pronotum, those on hemelytra more or less effaced, the lighter figures broad, yet so dark that the general effect is dark.

Structural characteristics: Head broad and short, that of male slightly longer than that of female as seen from above and more than half the length of the pronotal disk. Interocular space slightly greater than eye width in female. Face of male broadly depressed. Pronotal disk a little longer than half its width, its rear margin broadly rounded. Pronotum, clavus and basal half of corium rastrate. Legs short and stout. The front leg of male as shown on Plate LXVI. The tibia expanded into a plate that is tipped by a spine, but since this plate is directed forward instead of dorsally, it does not show its real width in the illustration; a comb of bristles at the distal base, the pala thin, a row of about 18 pegs on the middle of the inner face, the short basal ones making a hook, the distal ones elongate. Another row of six pegs in line with the basal half of the upper palmar row of bristles which continues just below and terminates with the peg row; after an interruption there is a row of about eight stout spines. About half the middle tarsus extending beyond the abdomen. The comparative lengths of the leg segments as follows:

Middle leg: Femur : tibia : tarsus : claws :: 100 : 50 : 32.5 : 39. Hind leg: Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100 : 113 : 49.3. The spines on hind femora less conspicuous than in *P. beameri.* Metaxyphus long and slender. Odoriferous gland pores guarded by some strong spine-like hairs. The male abdomen dextral, the strigil wider than long, of six or eight combs and hidden beneath a layer of stiff bristles projecting from the rear margin of the fifth segment. The seventh tergite with a large semicircular lobe. The genital capsule as shown on Plate LXVI.

Comparative notes: This species must be very near *P. ocotlanen-*

sis (Jaczewski), from which it differs in characters that cannot be ignored. The shape of the seventh abdominal tergite cannot be reconciled with the drawing given by Dr. Jaczewski of his species. The strigil, while guarded by hairs projecting from a lobe of the fifth tergite, consists of six or eight combs instead of four as in *P. ocotlanensis* (Jaczewski), and the right clasper has a characteristic bend on its concave margin not seen in Dr. Jaczewski's species. It also lacks the small denticulations on its inner margin just before the blunt apex described from Dr. Jaczewski's species. In none of the seventeen specimens is there any clear indication of a pale, oblique stripe on the membranal suture. In all of my specimens the left membrane is hyaline, the right one more pigmented.

Location of types: Described from seven males and seven females taken twelve miles west of Villa Victoria, *State of Mexico,* March 23, 1939. We also have three males from Puebla, *Puebla,* Mexico, taken by Henry Thomas, August 16, 1937. Holotype, allotype and paratypes in Francis Huntington Snow Entomological Museum.

Data on geographical distribution: (Plate XC.) In addition to the type series, we have before us the following: MEXICO: *Michoacán,* Zacapú, September 1, 1938, Thomas and Lipovsky, 3 males, 1 female; *Michoacán,* Carapa, September 2, 1938, H. D. Thomas, 1 female; *Jalisco,* Guadalajara, September 13, 1938, H. D. Thomas, 2 males, 8 females.

Pseudocorixa conata (Hungerford)

(Plate LXVI, 8 figs.)

1939 *Sigara conata* Hungerford, H B Jl Kansas Ent Soc, Vol. XII, No. 4, p. 124, pl-p. 125, figs 1, 2, and 6.

Size: Length 5.5 mm., width across the head 1.99 mm. A fairly short, compact species.

Color: General facies much as in *P. beameri* (Hungerford), the pale lineations not conspicuous. Eight or nine pale bands on pronotum, those of hemelytra more or less effaced, the lighter figures broad, yet so dark that the general effect is dark. Embolar groove brown to black. Venter, including the coxae, black in the two males before me.

Structural characteristics: Head broad and short as seen from above, about half as long as the pronotal disk. Face of male only moderately flattened, not depressed. Front margin of vertex broadly rounded as seen from above. Pronotal disk slightly longer than one-half its width. A short keel on anterior median line visible on one of the males. Caudo-lateral angle of disk not pointed. The front leg of the male as shown on Plate LXVI. A stridular field of pegs on the femur; the tibia conically produced and terminated by a spine—a strong comb of bristles at the distal base; the pala thin—a sigmoid row of about 16 pegs on the middle of the inner face, the distal pegs longer. Above this row a patch of thin short bristles. Another row of 8 pegs just above the upper palmar row of bristles which terminates with the distal end of the peg row; distally is an oblique row of about 9 stout spines. The middle legs relatively longer than in *P. beameroidea,* the tip of the tibia reaching the end of the abdomen. The relative length of the leg segments as follows:

Middle leg: Femur : tibia : tarsus : claws :: 100 : 48.4 : 35. 5 : 43.44. Hind leg: Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 107.2 : 112.5 : 62.5. The middle femur with a thick patch of straw colored hairs on the distal third of the rear margin. These are matted down in the two specimens at hand and give the femur the appearance of being enlarged on its outer third. Metaxyphus long and slender. Odoriferous gland pores prominent and guarded by hairs. The male dextral with a small strigil of three combs on the right side of the distal end of a long pedicle. The genital capsule as shown on Plate LXVI.

Comparative notes: This easily identified species is somewhat uncertain in its relationships. The strigil is located at the end of an elongation of the sixth abdominal tergite. *Morphocorixa lundbladi* Jacz. and *Morphocorixa compacta* (Hungerford) have a similar prolongation but no strigil. The pala is unique, while the cone-shaped expansion of the front tibia may be an extreme expression of a much less noticeable expansion of the tibia in *P. beameri* (Hungerford). The right lobe of the eighth abdominal segment is but slightly constricted at its outer base and does not show any indication of the lateral projection of this lobe which is so characteristic in *Morphocorixa lundbladi* Jaczewski. *Neosigara columbiensis* Lundblad has a strigil on a pedicle, but its general facies and certain structural characters make it not congeneric with *P. conata* (Hungerford).

Location of types: Described from two males taken twelve miles west of Villa Victoria, State of Mexico, on March 23, 1939. Alt. 2,580 meters. Types in the Francis Huntington Snow Entomological Collections. (See Plate XC.)

Pseudocorixa ocotlanensis (Jaczewski)

(Plate LXV, 3 figs, drawings after Jaczewski)

1938 *Sigara ocotlanensis* Jaczewski, T. Annales Musei Zoologici Polonici, Tom. IX, Nr. 21, pp. 333-335; Tab. XLVI, figs. 9, 10, and 11.

Since this species is known only from a mutilated male lacking front and middle legs it is necessary to quote Doctor Jaczewski's description and hope that perfect specimens may someday be recognized and that we have placed the species in its proper position.

"Mexico, Ocotlán, 1 male (Hungarian National Museum, Budapest).

"General shape stout and compact. Ground color of pronotal disk and of hemelytra dark brown with a bluish shine, pale pattern very little conspicuous, strongly effaced, general appearance therefore very dark. Head, underside and legs greyish yellow. Eyes blackish brown.

"Head, when seen from above, equals in length about ⅔ of the length of the pronotal disk. Postocular and subocular space very narrow. Posterior margin of the vertex slightly infuscated. Frontal arch evenly rounded. Facial impression of the male distinct, but moderately developed, almost glabrous.

"Pronotal disk a little over twice as wide as long, crossed by about 8 narrow, pale transverse lines, of which the anterior ones are a little wider. Posterior angle broadly rounded, little pronounced. Lateral angles blunt. In front of the disk a very faint indication of a median keel. Lateral lobes of the prothorax almost parallel-sided, rounded at the apex.

"Pronotal disk, clavus and base of corium distinctly and strongly rastrated. Remaining portion of corium smooth, a little rugulous. The pale transverse lines of the clavus and of the corium rather irregular, much interrupted, here and there anastomosing, and strongly effaced, almost confluent with the dark ground color. At the base of the clavus the lines are a little widened interiorly and partly confluent with each other into a paler spot. Outer angle of the corium uniformly pale, the pattern disappearing here altogether. Membranal suture marked by a pale oblique stripe. Marginal area almost black in its basal portion then gradually paler with a dark spot at the outer basal angle of the membrane. Margins of the latter uniformly smoky with the pattern obliterated.

"The front and intermediate legs of this specimen were unfortunately broken away and could not be examined.

"Fifth abdominal tergite with a prestrigilar tuft of stiff hairs.

Strigil small, transversely oval in shape, with four short combs (Fig. 9). Central lobe of the seventh abdominal tergite strongly developed (Fig. 10). Right paramere with some small denticulations on its inner margin just before the blunt apex (Fig. 11). Left paramere strongly tapering towards the end. Inner sheath of the penis anchor-like. Posterior processus of the ninth abdominal segment simple.

"Length 5.5 mm.

"This species seems to stand closest of all to *Arctocorixa beameri* Hungfd. from Arizona, from which it differs, however, by the shape of the right paramere and of the strigil. Without an examination of the front legs of the male it is difficult to say whether this species should not be placed (perhaps together with the mentioned species of Hungerford) in some other genus."

(See Plate XC for distribution).

PLATE LXV

Pseudocorixa Jaczewski

FIG. 1. *Pseudocorixa guatemalensis* (Champion); pala of male.

FIG. 1a. Genital capsule of male.

FIG. 1b. Dorsal view of male abdomen.

FIG. 2. *Pseudocorixa ocotlanensis* Jaczewski; dorsal view of 7th segment of male abdomen and strigil. Jaczewski's figures 9 and 10.

FIG. 2a. Right clasper of male.* Jaczewski's figure 11.

FIG. 3. *Pseudocorixa beameri* (Hungerford); dorsal view of male abdomen.

FIG. 3a. Genital capsule of male. (For pala see Plate LXVI.)

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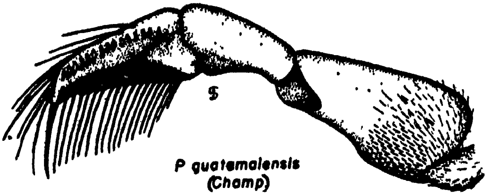
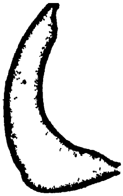
* Drawings after Jaczewski

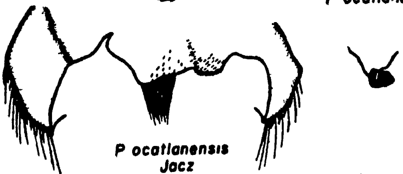
PLATE LXV



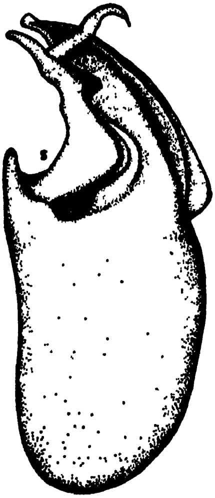
P guatemalensis (Champ)



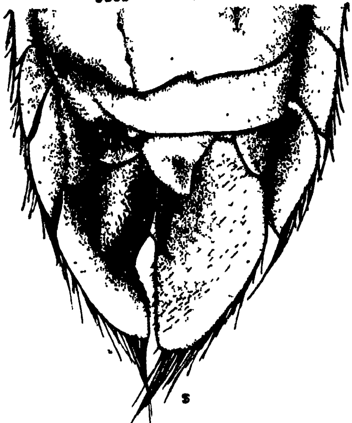
P ocatlanensis



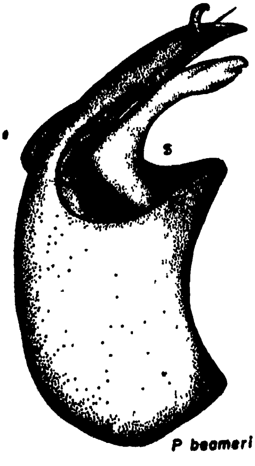
P ocatlanensis Jacz



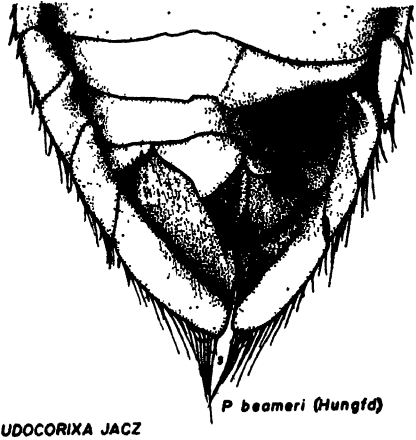
P guatemalensis



P guatemalensis



P beameri



P beameri (Hungfd)

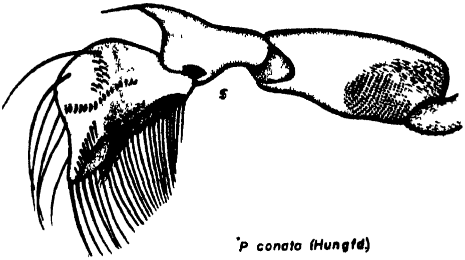
PSEUDOCORIXA JACZ

PLATE LXVI

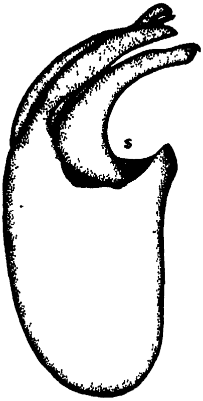
Pseudocorixa Jaczewski

FIG. 1. *Pseudocorixa conata* (Hungerford); pala of male.
FIG. 1a. Genital capsule of male.
FIG. 1b. Dorsal view of male abdomen.
FIG. 2. *Pseudocorixa beameri* (Hungerford); pala of male.
FIG. 3. *Pseudocorixa beameroidea* (Hungerford); pala of male.
FIG. 3a. Genital capsule of male.
FIG. 3b. Dorsal view of male abdomen.

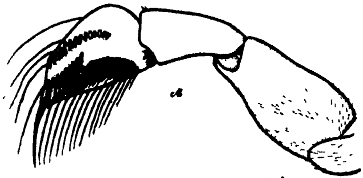
PLATE LXVI



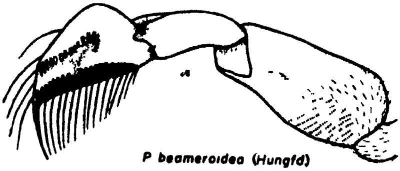
P conata (Hungfd)



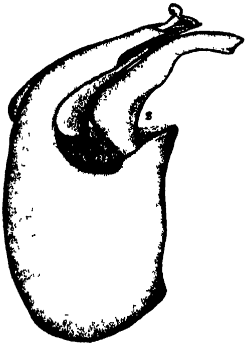
P conata



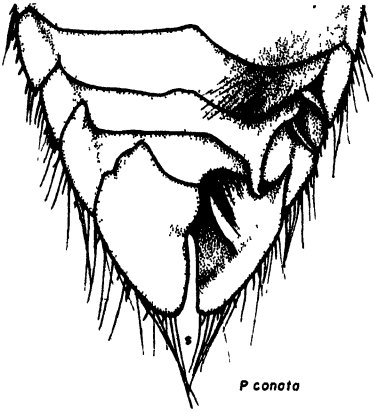
P beameri (Hungfd.)



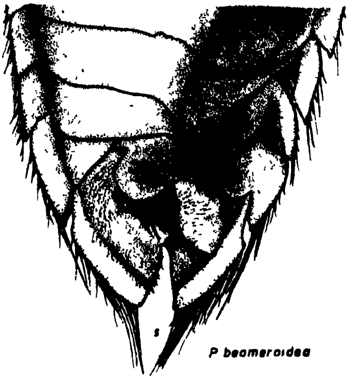
P beameroidea (Hungfd)



P beameroidea



P conata



P beameroidea

PSEUDOCORIXA JACZ

Morphocorixa Jaczewski

1931. Jaczewski, T. Annales Musei Zoologici Polonici, Tom. IX, No. 15, p. 197. (New subgenus of *Sigara* for *Arctocorixa compacta* Hungerford as subgenotype.)

1935. Poisson, R. Archives de Zool. Exp. et Gén. LXXVII, pp. 465 and 504.

1936. Poisson, R. Bulletin de la Societe Scientifique de Bretagne, Tom. XIII, Fasc. 1 and 2, p. 6.

1943. Walton, G. A. Trans. Soc. for British Entomology VIII, p. 157 (as subg. of *Trichocorixa* Kirk.).

Rather stout-bodied corixids, relatively broad and compact, with tip of tarsus of middle leg barely reaching tip of abdomen. Head short as seen from above. Postocular and subocular space narrow. Pronotum and clavus rastrated. Corium nearly smooth, semihyaline and often indistinctly separated from membrane. Scattered hairs on hemelytra. Embolar area wide; the pruinose area of the embolar groove posterior to the nodal furrow short (never more than $\frac{5}{12}$ the length of the cubital ridge) and slightly longer than the pruinose area along the claval suture. Lateral lobe of pronotum linguiform, broadly rounded at the apex. The distance between the shining basal apices of the clavus and corium equal to the distance between the basal apex of the corium and the distal end of the pruinose area along the claval suture. Metaxyphus elongate. The anterior tibia with apical comb of spines. Ventral side of basal half of hind femur pubescent. Middle femora not longitudinally grooved on ventral surface. Asymmetry of male dextral, strigil absent but a strigilar pedicle present. The lobes of the eighth abdominal segment unlike, the right one reduced with a lateral projection.

Comparative notes: This genus is near some of the species we are assigning to *Pseudocorixa*. *P. conata*, for example, has a strigil on the end of a long pedicle but *Morphocorixa* has only the pedicle. The modified right lobe of the eighth abdominal segment in the male is distinctive for *Morphocorixa*. *Neosigara* Lundblad, to which Doctor Lundblad once assigned *M. compacta* (Hungerford), is not as closely related to *Morphocorixa* as is *Pseudocorixa* Jaczewski.

Distribution: Southwestern United States and Mexico. Texas and Arizona in the United States and from Chihuahua and Sonora to Colima and Guerrero in Mexico. The two known species seem to be separated by the Sierra Madre Mountains, *M. compacta* on the east, extending from Texas to the state of Tamaulipas in Mexico, and *M. lundbladi* on the west, from the Santa Rita Mountains in Arizona to Guerrero in Mexico, the Chihuahua record being west of the range. It seems likely that *M. compacta* will be found in Chihuahua, opposite the Big Bend country of Texas, and in Coahuila, Mexico.

These two species in general facies are alike, but *M. compacta* has only 7 or 8 brown lines on the pronotum while *M. lundbladi* has 9. The males are consistantly different in palar characters, in the shape of the right lobe of the eighth abdominal segment and in the genital capsule characters (see Plate LXVII.) The following key will separate the species:

KEY TO *MORPHOCORIXA* LUNDBLAD

A. With the meron equal in length to the pruinose area along the claval suture in both sexes .... *M. lundbladi* (Jacz.)

AA. With the meron shorter than the pruinose area along the claval suture in both sexes .... *M. compacta* (Hungfd.)

Morphocorixa compacta (Hungerford)

(Plate LXVII, figs. 1, 1a to 1d. Wash drawing No 8, Plate IV)

1925. *Arctocorixa compacta* Hungerford, H. B Bull. Brooklyn Ento. Soc., XX, p. 22, Pl. II, figs. 2-5. (Desc from Eastland Co., Tex.)

1928. *Neosigara compacta*, Lundblad, O. Entomologisk Tidskrift, XLVIII, Haft 4, p. 227.

1931 *Sigara (Morphocorixa) compacta*, Jaczewski, T. Annales Musei Zoologici Polonici, Tom. IX, Nr. 15, p. 197, pl. XXVI, figs. 13, 15, 18.

1939 *Arctocorixa compacta*, Millspaugh, Dick D. Field and Laboratory, VII, No. 2, p. 85.

Size: Length 5.9 mm. to 7 mm.; width of head from 1.96 mm. to 2.38 mm. Males slightly smaller than the females.

Shape: Very compact, relatively broad species.

Color: Pattern as a whole rather indistinct. The markings on the hemelytra often faint. The pronotum crossed by 7 or 8 dark brown bands which are sometimes somewhat broken, the yellow bands usually slightly wider than the brown. On the hemelytra the pale bands twice as broad as the dark ones, both of which are frequently nearly obliterated, leaving an almost hyaline corium. Head, legs and venter yellow, the latter sometimes dark.

Structural characteristics: Head very short and broad as seen from above. Frontal depression scarcely discernible in the male. Pronotum and clavus rastrate. Corium shiny. Pruinose area along the claval suture longer than the meron in both sexes. Front femur not much thickened at base. Pala as shown on Plate LXVII, figure 1. The distal pegs of the row elongate; a few pegs in the upper palmar row of bristles. The strigilar pedicle rather long and flat without a strigil; the right lobe of the eighth abdominal segment with a broad projection that is broadly folded as seen in lateral view. The posterior process of the genital capsule with a large sclerotized flap. (See Plate LXVII for details.)

Comparative notes: The comparatively broad compact appearance with its often semihyaline hemelytra distinguishes this species. In addition it may be separated from the following species by the fact that the meron is shorter than the pruinose area along the claval suture.

Location of types: Described from 255 specimens from Eastland County, Texas, taken in May, 1921, by Mrs. Grace Olive Wiley. Holotype, allotype and many paratypes in the Francis Huntington Snow Collections of the University of Kansas. Paratypes were sent to Mrs. Wiley, Mr. J. R. de la Torre-Bueno, Mr. William E. Hoffmann, Doctor H. M. Parshley, Doctor R. F. Hussey and the United States National Museum.

Data on distribution: (Plate LXVIII.) This species was described from a long series of specimens taken by Mrs. Grace Wiley in Eastland County, Texas. Other records before us are:

U. S. A. *Texas:* Randall County, July 7, 1927, R. H. Beamer, 1 female; Menard County, July 19, 1928, R. H. Beamer, 2 males, 1 female; Kerr County, July 21, 1928, L. D. Beamer, 1 female; Kerr County, April 9, 1939, D. Millspaugh, 1 male, 3 females; Kendall County, July 22, 1928, R. H. Beamer, 3 males, 2 females; Hays County, San Marcos, Charles Burt, 2 males; Jim Wells County, July 24, 1928, R. H. Beamer, 3 males, 1 female; Jim Wells County, July 24, 1928, A. M. James, 1 male, 1 female; Jim Wells County, Alice, Jan. 21, 1946, L. D. Beamer, 20 males, 12 females; Alfred, July 24, 1928, R. H. Beamer, 7 males, 9 females; Falfurrias, Jan. 1, 1946, L. D. Beamer, 18 males, 39 females; Cameron County, Aug. 13, 1928, A. M. James, 2 females; Hidalgo County, November 22, 1932, L. D. Tuthill, 2 males, 3 females; Hidalgo County, McAllen, November 20, 1932, L. D. Tuthill, 1 male (sinistral), 2 females; McAllen, Dec. 30, 1945, L. D. Beamer, 1 male, 2 females; Starr County, July 5, 1938, R. I. Sailer, 2 males, 4 females; San Marcos, Charles Burt, 25 males, 36 females; Sutton County, July 20, 1928, J. G. Shaw, 9 males, 7 females; Val Verde County, Langtry, July 9, 1938, D. W. Craik, 2 males, 4 females; Val Verde County, Del Río, July 8, 1938, D. W. Craik, 1 male; Val Verde County, Del Río, 1937, H. D. Thomas, 1 male; Terrell County, Sanderson, July 9, 1938, D. W. Craik, 2 males, 3 females; Brewster County, Alpine, February, 1927, G. P. Engelhardt, 1 female; Jeff Davis County, Valentine, July 13, 1927, R. H. Beamer, 2 males, 1 female; Victoria, Dec. 27, 1910, J. D. Mitchell, 8 males, 12 females (U. S. N. M.); Brewster County, Glenn Springs, July 29, 1928, F. M. Gaige

(Mich. Coll.), 1 female; Austin, Oct., 1899, C. T. Brues, 1 female; Eastland County, May 23, 1921, Grace Wiley, 2 males.

MEXICO: *Tamaulipas:* San José, April, 1910, 2 males, 2 females; Vallecillo, nr. Nuevo Laredo, Sept. 1, 1944, H. D. Thomas, 5 males, 2 females.

Hidalgo: 18 mi. n. of Aguas Friás, H. D. Thomas, 2 males, 2 females.

Morphocorixa lundbladi (Jaczewski)

(Plate LXVII, figs 2, 2a-2c)

1931 *Sigara* (*Morphocorixa*) *lundbladi* Jaczewski, T. Annales Musei Zoologici Polonici, Tom. IX, Nr 15, pp 197-201, Pl. XXVI, figs. 12, 14, 16, 17, 19, 20; Pl. XXIX, fig. 61, (Desc. from Colima, Mexico).

Size: Length 5.85 mm. to 7.5 mm.* Width of head 2.24 mm. to 2.31 mm. The males slightly smaller than the females. Very compact, relatively broad species.

Color: Pattern as in *M. compacta* except that the pronotum is crossed by 9 brown bands instead of 7 or 8. The head, legs and venter yellow except that the abdominal venter of male is usually dark and the females have a dark band along the margin.

Structural characteristics: Head short and broad as seen from above. Frontal depression scarcely discernible in the male. Fourth antennal segment 58.1 percent of the third. Pronotum and clavus rastrate, corium smooth. Pruinose area along the claval suture equal in length to the meron. Front femora not much thickened at the base. Jaczewski gives the relative lengths of the various parts of the middle and hind legs as follows: For the middle leg: Femur : tibia : tarsus : claw :: 100 : 48.2 : 30 : 42.7. For the hind leg: Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 96.9 : 107.8 : 51.6. Male pala as shown on Plate LXVII, figure 2. No pegs in the upper palmar row of bristles. The strigilar pedicle long, slender and broaded at tip, without a strigil. The right lobe of the eighth abdominal segment with a slender projection that is narrowly folded, as seen in lateral view. The posterior processus of the genital capsule as shown in figures 2a and 2b on Plate LXVII.

Location of types: Jaczewski described this species from 1 male and 2 females taken at Colima, Mexico, August 20, 1929. The types are doubtless at the Polish Museum in Warsaw.

Comparative notes: Both sexes may be distinguished from *M. compacta* (Hungerford) as already indicated in the key. In addi-

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* Jaczewski gives 7.5 mm. as the length of his species. We have 23 specimens, but none attains even 7 mm.

tion, the males show differences in the palae, the strigilar pedicle, the right lobe of the eighth abdominal segment, the right clasper, and the posterior process of the genital capsule (ninth segment). (See Plate LXVII.)

Data on distribution: (See Plate LXVIII.) The type series, 1 male and 2 females, were taken at Colima, Mexico, "about 450 meters above sea level in a large temporary pool on a country road, no aquatic plants." With it were taken *Pseudocorixa guatemalensis* (Champ.) and *Centrocorisa kollarii* (Fieb.). We have in the University of Kansas collection the following:

MEXICO: *Guerrero:* Iguala, October 7, 1936, H. D. Thomas, 1 male, 3 females; Río Balsas, Klm. 259, S. Mexico City, October 31, 1936, H. D. Thomas, 1 male.

Jalisco: Tecolotlan, September 17, 1938, H. D. Thomas, 1 male.

Sonora: Salitial Río Mayo, February 23, 1935, H. S. Gentry, 3 females; Tepopa S. Charibo, March 9, 1935, H. S. Gentry, 5 males, 5 females; Conejos Dist. Alamos, October 26, 1934, H. S. Gentry, 1 female.

Chihuahua: San Luis Babarocos, December 30, 1934, H. S. Gentry, 2 males.

U. S. A.: *Arizona:* Santa Rita Mountains, June 12, 1933, R. H. Beamer, 1 male.

PLATE LXVII

Morphocorixa Jaczewski

FIG. 1. *Morphocorixa compacta* (Hungerford); front leg of male.

FIG. 1a. Left view of tip of 9th segment of male adbomen (genital capsule).

FIG. 1b. Ventral view of tip of 9th segment of male abdomen (genital capsule).

FIG. 1c. Genital capsule of male.

FIG. 1d. Dorsal view of male abdomen.

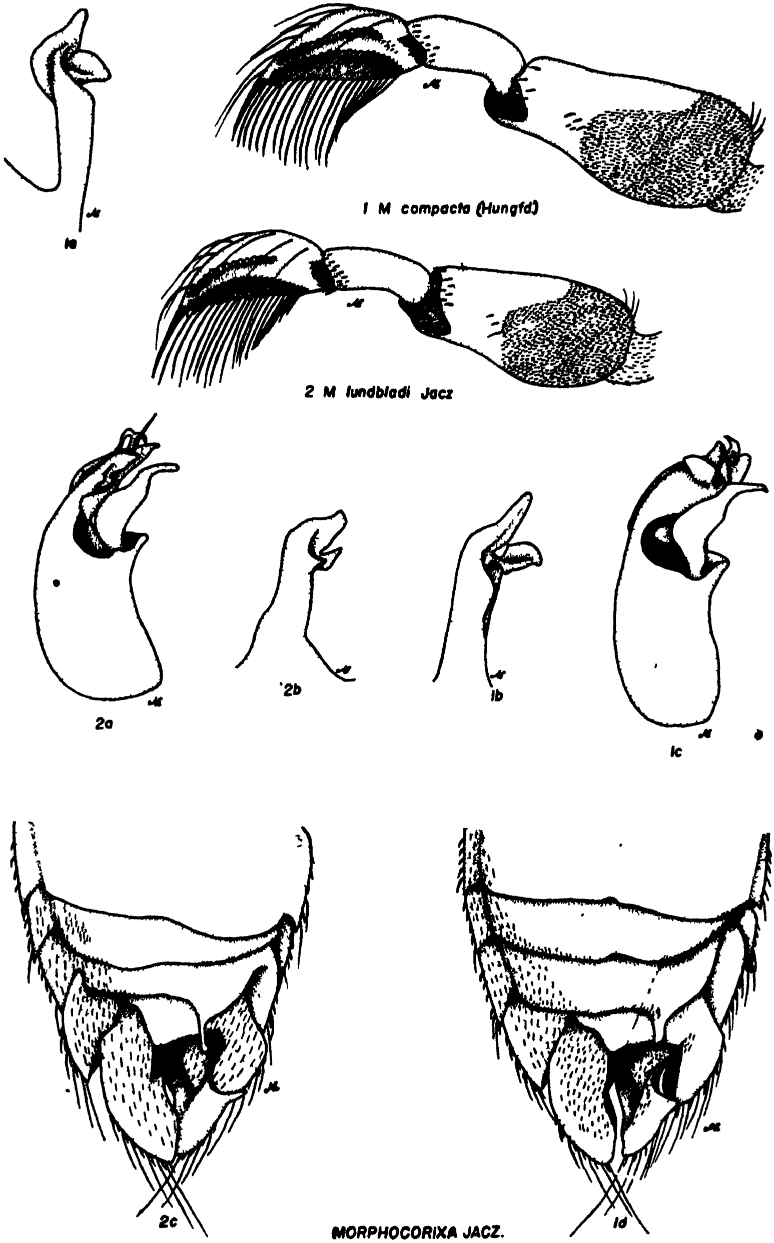
FIG. 2. *Morphocorixa lundbladi* (Jaczewski); front leg of male.

FIG. 2a. Genital capsule of male.

FIG. 2b. Ventral view of tip of 9th segment of male abdomen (genital capsule).

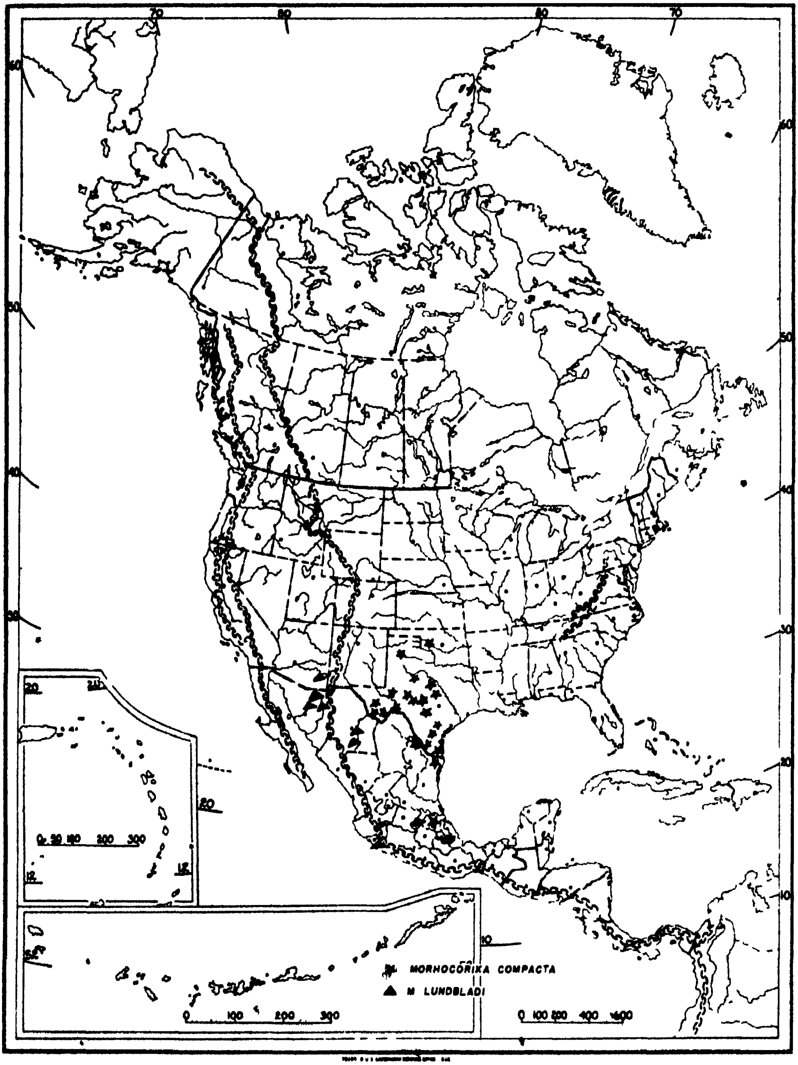
FIG. 2c. Dorsal view of male abdomen.

PLATE LXVII



MORPHOCORIXA JACZ.

PLATE LXVIII



Neosigara Lundblad

1928. Lundblad, O. Entomologisk Tidskrift, XLVIII, Häft 4, p. 222 (new genus with genotype *columbiensis*).

1931. Jaczewski, T. Annales Musei Zoologici Polonici IX, Nr. 15, p. 197 (compares his *Sigara* (*Morphocorixa*) with *Neosigara* Lundb.).

1935. Poisson, R. Arch. de Zool. Exp et Gén , LXXVII, p. 458 (Neotropical).

1943. Walton, G. A. Trans. Soc. for British Entomology, VIII, Pt. 5, p. 158 (proposes *Neosigara* as subg. of *Corixa*!).

These corixids are rather broad and compact and moderately rastrate but shining. The pruinose area on the corial side of claval suture long. The interocular space is broader than an eye. Lateral lobe of prothorax elongate, obliquely truncate, the anterior distal angle produced. Metaxyphus long and bluntly rounded at tip. Male pala with two rows of pegs, the lower one near margin of palm interrupted and of elongate pegs. Genotype *N. columbiensis* Lundblad.

Doctor Lundblad proposed this genus for his new species *N. columbiensis* and gave in his generic diagnosis the statement that the males àre dextral and strigil present. I am convinced, however, that *C. griffinii* Kirk. is congeneric with *N. columbiensis* although the males are sinistral, for the most part, and lack a strigil.

KEY TO *NEOSIGARA* LUNDBLAD

1. Males normally with sinistral asymmetry, strigil lacking (see text fig. 5).
N. griffinii (Kirk.)
(= *C. williamsi* Hungfd.)
(see p 429)
Males with dextral asymmetry, strigil present...... 2

2. (1) Distal margin of ventral pubescent area of the hind femur deeply incised; dorsal view of male abdomen as on Plate LXIX, fig. 2b.....*N. columbiensis* Lundb
(see p 432)
Distal margin of ventral pubescent area of the hind femur smoothly curved; dorsal view of male abdomen as on Plate LXIX, fig. 1b...*N. murilloi* n. sp
(see p. 433)

Neosigara griffinii (Kirkaldy)

(Text fig. 5; wash drawing No. 33, Plate VI)

1899. *Corixa* (*Callicorixa*) *griffinii* Kirkaldy, G. W Bollettino Musei di Zoologia ed Anatomia Comparata (Torino), XIV, N. 350, pp. 7-8, fig. 6-7 (desc. from Ecuador).

1909. *Callicorixa griffinii*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la Catalogue *in* Proc. Ent. Soc. Washington, X, p 193.

1928. *Corixa williamsi* Hungerford, H. B. Bull. Brooklyn Ent. Soc , XXIII, p. 175, Pl. VII, figs. 11, 12 and 13 (desc. from Ecuador and records reversed asymmetry of male).

1931. *Corixa williamsi*, Jaczewski, T Annales Mus. Zool. Polonici, IX, No. 15, p. 208.

1933. *Sigara griffinii*, Jaczewski, T Ann. Mus. Zool. Pol., IX, No. 21, pp. 335-336, Pl. XLVI, figs. 2, 12 (*Corixa williamsi* Hungerford is a syn.).

1939. *Sigara griffinii*, Hungerford, H B Jl. Kans. Ent. Soc., XII, No. 2, p. 72 (of 751 males only 6 dextral).

Size: Length 5.4 mm. to 6.3 mm.* Width across eyes 1.8 mm. to 2.2 mm.

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* Kirkaldy gives 6.5-7 mm. but the female types studied by me are not so large.

Color: General facies medium brown. Pronotum crossed by 8 to 9 broken, irregular dark bands, distal ones tending to coalesce along latero-distal margins. Clavus with dark pattern obscure or lacking on inner basal angles; rest of clavus and corium banded with more or less irregular, transverse dark bands. Pale line separating corium from membrane which is also cross-banded, with apical margin dark. Embolium, head, limbs, and thorax pale; abdomen pale throughout in females, smoky at base in males.

Structural characteristics: Head about four times as broad as long; interocular space greater than the width of an eye; vertex produced in both sexes as seen from above; face not hairy; male fovea poorly defined, shallow and narrow; antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 18 : 30 : 25 ♂; 1 : 2 : 3 : 4 :: 22 : 18 : 32 : 25 ♀. Pronotal disk without a median carina, lateral margins angulate, distal margin rounded; pronotum and hemelytra moderately rastrate, the latter without hairs; pruinose area of embolar groove posterior to nodal furrow longer than that of the claval suture. Lateral lobe of the prothorax elongate, slender, apex obliquely truncate; mesoepimeron narrow with osteole near the tip; metaxyphus longer than broad, apex blunt. Front leg of female of usual shape. Front leg of male: pala with dorsal margin curved from base to apex as seen in lateral view, about 21 pegs in curving row, those in middle of row stouter; upper palmar row of stout bristles with a gap beyond the middle, basal spines slender, apical ones stouter; long hairs in palm between bristle row and the lower palmar row of bristles; tibia two-thirds as long as pala with short carina and a small pad; femur slender without stridulatory pegs at base. Middle and hind legs slender; hind femur with two rows of short spines on ventral surface near apex and midway between margins; the proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.6 : 36.7 : 43.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 99.9 : 136.6 : 37.2. Male asymmetry sinistral; strigil lacking. Some specimens show a small projection or stalk at the place on the sixth abdominal segment where a strigil would normally occur. This is probably the vestigial remains of a strigil-bearing stalk such as is found in the other two species of this genus. Left clasper of male genital capsule broad and blunt. For details of male structures see text fig. 5. Female abdomen normal.

Comparative notes: The absence of a strigil and other male characters serves to separate this species from *N. columbiensis* Lundb. and *N. murilloi* n. sp.

Location of types: Types of *Sigara griffinii* (Kirkaldy) in Turin Museum (Italy); two females labeled "cotype," and the types of *Corixa williamsi* Hungerford in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XXXV.) *Ecuador:* Baños, Tunguragua Lake, Jan. 1, 1923, F. X. Williams, 4 males (1 reversed), 5 females; Baños Lake, March, 1936, Clark MacIntyre, 408 males (2 reversed), 363 females; Panti Cocha, April, 1936, C. MacIntyre, 111 males (2 reversed), 103 females; Runtun Lake, Baños, June, 1936, C. MacIntyre, 93 males (2 reversed), 83 females.

Perú: Dept. of Cajamarca, Andes 2,625 m. above sea level, vic. Celendín, May-June, 1936. F. Woytkowski, 7 males (2 reversed), 5 females; Dept of Amazonas, San Idelfonso, 4,000 m. above sea level, cold ponds, July 29, 1936, F. Woytkowski, 2 males (1 reversed), 1 female

The two female co-types notes above are labeled "Lago di Kingora, Mus. Turin, det 1899, Kirkaldy."

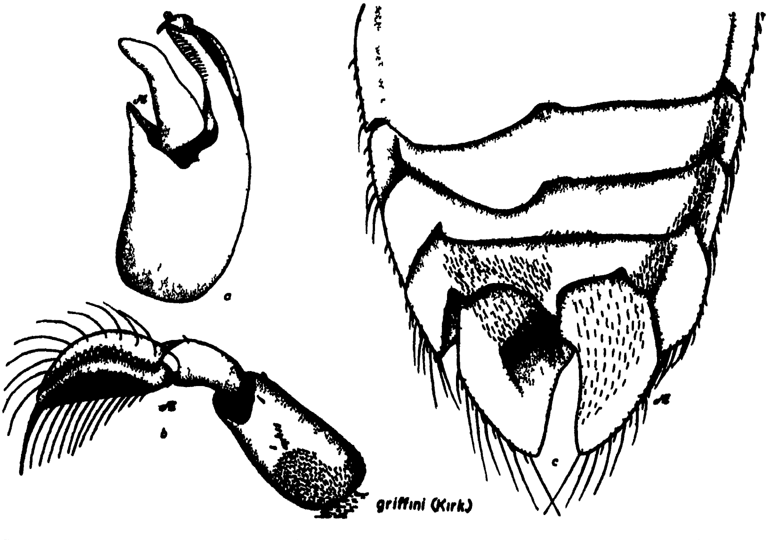


FIG. 5 *Neosigara griffinii* (Kirk); (*a*) genital capsule of male, (*b*) front leg of male; (*c*) dorsal view of male abdomen

Neosigara columbiensis Lundblad

(Plate LXIX, figs. 2, 2a-2c; Plate VI, fig. 34)

1928. *Neosigara columbiensis* Lundblad, O. Ent. Tidskrift, XLVIII, Häft 4, pp. 222-227, text figs. 5-8, Pl. IV, fig. 1.

1935. *Neosigara columbiensis*, Poisson, R. Arch. de Zool. Exp. et Gén., LXXVII, p. 458.

Size: Length 5.7 mm. to 5.9 mm. (males). Width across eyes 1.9 mm. (males). General appearance rather short and stout.

Color: General facies pale to medium brown. Pronotum crossed by about 8 to 11 dark bands of which the posterior three or four are irregular and much broken. Clavus with oblique dark bands which are narrower on the inner basal portion and thicker distally. Corial pattern vermiculate, the brown coloration sometimes fine and sometimes coarser, pattern extending to wing margin across end of embolar groove. Membrane not plainly separated from corium though a palish line may be present in some specimens. Embolium, head, limbs and venter pale.

Structural characteristics: Head about two-thirds as long as the pronotal disk; interocular space greater than the width of an eye as measured by projection; vertex roundly produced; male fovea deep and broad, not quite attaining the eyes laterally; face of male rather hairy; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 20 : 40 : 20 male. Pronotal disk about half as long as broad, lateral margins almost truncate; median carina faintly visible on anterior third; apex of disk angulate; pronotum and hemelytra moderately rastrate, the latter with scattered pale hairs. Pruinose area along the claval suture a little shorter than the post-nodal pruinose area. Lateral lobe of prothorax elongate with anterior apical angle produced and posterior one rounded. Mesoepimeron narrow with osteole near the tip; metaxyphus longer than broad, pointed. Front leg of male: Femur slender with a pilose area covering about two-thirds of inner surface on basal portion and followed by a patch of short, stout spines; tibia slender with little indication of a dorsal carina and no pad; pala short and broad, dorsal margin rounded, distal margin obliquely slanted from dorsal margin to insertion point of claw, peg row following dorsal margin and consisting of about 22 pegs of which those in center of row are larger than those at either end; distal ones rather long and slender; upper palmar row with bristles on basal half, and pegs the rest of way in two groups of 4 to 6 pegs each, with a space between the two groups. Middle and hind legs slender; ventral pubescent area of the hind femur as shown on Plate LXIX, fig. 2c, a group of short spines on the glabrous portion as shown in same figure. Comparative measurements of segments: Middle leg: Femur : tibia : tarsus : claw :: 100 : 46.2 : 35.4 : 46.2. Hind leg: Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 91.8 : 121.5 : 50.6. Male pala, genital capsule, and abdomen as shown on Plate LXIX, figs. 2, 2a and 2b. Median lobe of the seventh abdominal segment bilobate. Strigil small, of 3 regular combs, located at end of a stalk which curves toward the right.

Comparative notes: Males of this species may be distinguished from the following species by the shape of the ventral pubescent area of the hind femur, and by the shape of the median lobe of the seventh abdominal segment.

Location of types: Berlin Museum (type from Colombia).

Data on distribution: (Plate XXXV.) We have seen the following:

Colombia: Bogotá?, Lett., Sept. 6, 1936, L. M. Murillo (U. S. N. M.), 5 males; Bogotá, 3 males, 2 females (Bueno Coll.).

Neosigara murilloi n. sp.

(Plate LXIX, figs. 1, 1a, 1b, 1c)

Size: Length 5.9 mm. to 6.3 mm. Width across eyes 1.9 mm. to 2.1 mm. General shape short and rather stout.

Color: General facies medium to dark brown. Color pattern almost identical with that of the foregoing species. Base of embolium smoky to black in males, pale in females; head and limbs pale; abdomen smoky to black in males except along margins, pale in females.

Structural characteristics: Head about two-thirds as long as the pronotal disk; interocular space equaling the width of an eye in males, exceeding the width of an eye in females; vertex rounded; frontal depression of male shallow, narrow and rather sparsely haired; antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 18 : 38 : 20 ♂ ; 1 : 2 : 3 : 4 :: 20 : 20 : 40 : 20 ♀ . Pronotal disk half as long as broad, lateral margins almost truncate, median carina only faintly visible on anterior margin of disk; pronotum and hemelytra moderately rastrate, the latter with scattered pale hairs. Pruinose area along claval suture a little shorter than the post-nodal pruinose area. Lateral lobe of the prothorax elongate, apex bluntly rounded; mesoepimeron narrow with osteole near the tip; metaxyphus longer than broad, apex pointed.

Front leg of female of usual shape. Front leg of male: femur slender with a pilose area on inner surface, covering basal two-thirds, and followed by a small group of short, stout spines; tibia slender without a dorsal carina and with a small pad; pala as on Plate LXIX, fig. 1. Middle and hind legs slender; ventral pubescent area of hind femur as shown on Plate LXIX, fig. 1c; short spines on glabrous area as shown in same figure. Comparative measurements of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.7 : 32.8 : 44.7. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 94.4 : 115.8 : 51.5. Male pala, genital capsule, and abdomen as shown on Plate LXIX, figs. 1, 1a, and 1b. Strigil of moderate size, of 4 regular combs, located at end of caudally-directed flap. Median lobe of seventh abdominal segment with caudal margin irregular in shape (see fig. 1b).

Comparative notes: This species, though structurally and in general appearance quite close to *N. columbiensis* Lundb., may be separated from it chiefly by the shape of the median lobe of the seventh abdominal segment of the male and by the shape of the ventral pubescent area of the hind femur in the same sex.

Location of types: Holotype male, allotype female, and 1 male paratype, labeled "Bogotá?, Colombia, Lett., Sept. 6, 1936, F. M. Murillo," in the U. S. National Museum; 2 males and 1 female paratypes, with the same label, in the Francis Huntington Snow Entomological Collections, University of Kansas.

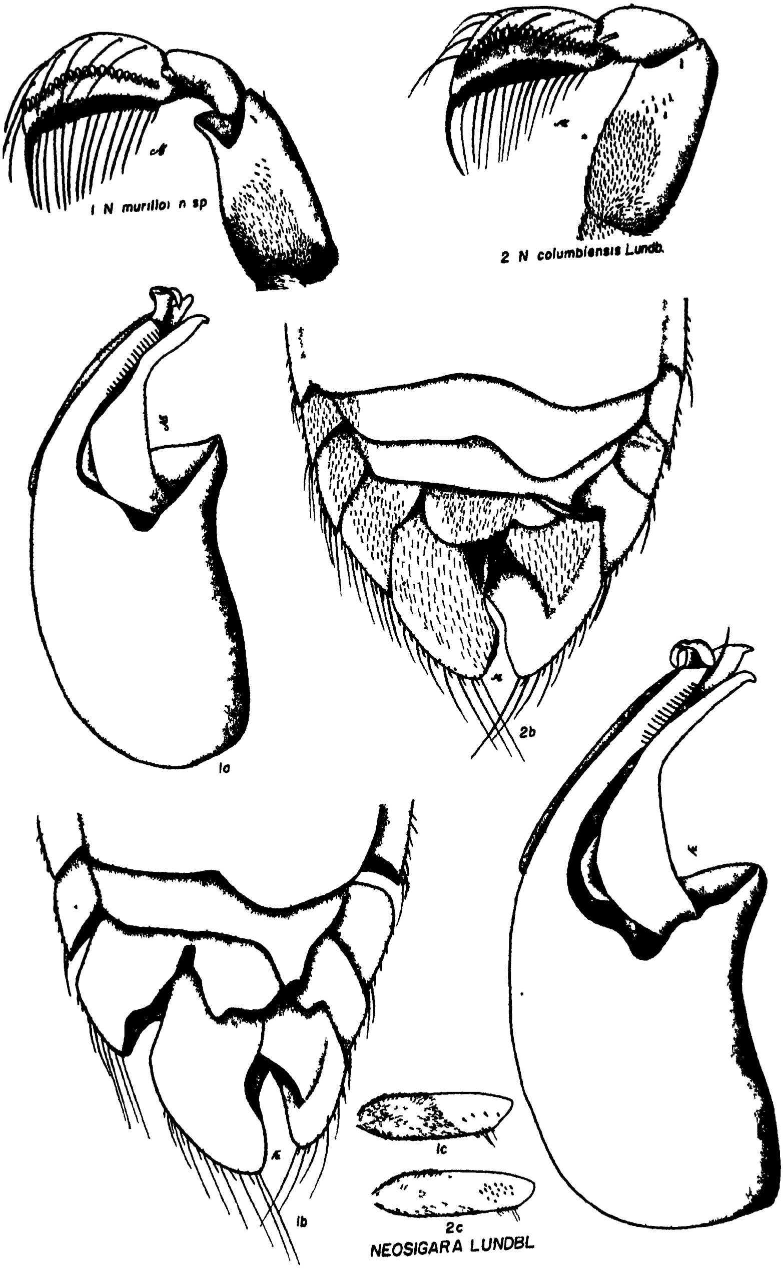
Data on distribution: (Plate XXXV.) Known to us only by the type series.

PLATE LXIX

Neosigara Lundblad

FIG. 1. *Neosigara murilloi* n. sp.; front leg of male.
FIG. 1a. Genital capsule of male.
FIG. 1b. Dorsal view of male abdomen.
FIG. 1c. Ventral view of hind femur of male.
FIG. 2. *Neosigara columbiensis* Lundblad; front leg of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Dorsal view of male abdomen.
FIG. 2c. Ventral view of hind femur of male.

PLATE LXIX



NEOSIGARA LUNDBL

Centrocorisa Lundblad

1928. Lundblad, O. Entomologisk Tidskrift, XLIX, Heft 2, p. 68. (In footnote proposes new generic name for *C. kollari* Fieb.)

1929. Lundblad, O. Archiv. für Hydrobiologie, XX, pp. 811-812. (Describes genus.)

1929. Lundblad, O. Entomologiske Meddelelser, XVI, pp. 277-280.

1935. Poisson, R. Archives de Zoologie Experimental et Générale, p. 458. (Only mentions as Neotropical.)

1943. Walton, G. A. Trans Soc. for British Entomology VIII, p 157. (As subgenus of *Trichocorixa* Kirk.)

Head with interocular space broader than the width of an eye. Body more than one-third as broad as long; legs short and stout. Pronotum with transverse brown bars, often interrupted. Hemelytral pattern reticulate. Surface of hemelytra moderately hairy. Corium nonrastrate, even at base. Pruinose area beyond the nodal furrow short; postnodal pruinose area, measured from the cubital angle, shorter than or barely equal to, the meron. Pruinose area along the claval suture short. The prothoracic lateral lobe linguiform, longer than broad, rounded on distal end, narrower in males than in females. Mesoepimeron moderately narrow. Metaxyphus elongate, large. Males characterized by dextral abdominal asymmetry, absence of a strigil, flattened, triangular prolongation of anterior tibia, and by a pala bearing two rows of pegs, the lower row interrupted with distal pegs setiform.

Genotype: *Centrocorisa nigripennis* (Fabr.).

Concerning the genus *Centrocorisa* Lundblad

During the summer of 1940 I made a revisional study of this genus. It contains two forms which I consider good species because we can distinguish both sexes readily. The names must be reviewed!

Fabricius, in his "Systema Rhyngotorum," 1803, described *Sigara nigripennis* from Insular America. I have seen the two female types in Copenhagen. They belong to the genus *Centrocorisa* Lundblad.

Fieber, in "Species Generis Corisa," 1851, described *Corisa kollarii* and wrote "Habitat in Brasilia (Mus. Vienn) Insula Cuba (Mus. Berol)." I have seen these specimens. Those in Vienna are labeled "Natterer Brasilien." They are the same as those described by Lundblad as *Centrocorisa kollarii* (Fieb.) var. *dispar* n. var.

Now we have the problem of names. There is no question about the name *Centrocorisa nigripennis* (Fabr.) for there is but one species of the genus in Insular America. I have specimens from Grenada and Barbados in the Windward Islands, from Antigua in the Leeward Islands, from Anegada in the Virgin Islands, from six localities in Puerto Rico, from Haiti, from thirteen collections in Jamaica, and from thirteen collections in Cuba. In this species the left clasper of the male is enlarged at the tip as figured by Doctor Lundblad [Entomologiske Meddelelser, Bd. XVI, p. 278, Fig. 1 of a specimen from the island of St. Croix, under the name *Centrocorisa kollarii* (Fieb.) 1929]. The female does not have the hair patches on clavus and corium which is a distinct feature of *Centrocorisa kollarii* (Fieb.) var. *dispar* Lundblad, although Doctor Lundblad appears to have overlooked this character. Thus *Centrocorisa kollarii* (Fieb.) as determined by Lundblad is *Centrocorisa nigripennis* (Fabr.).

Since Fieber had two distinct forms under *Centrocorisa kollarii* and mentions the one from Brazil first, we should consider his specimens labeled "Natterer Brasilien" as types, and I select a male and female as the lectoholotype and lectoallotype. Since these are the same as *Centrocorisa kollarii* (Fieb.) *dispar* Lundblad, it is necessary to consider Lundblad's form a synonym. I have before me three collections from Brazil, one from Bolivia, one from Ecuador, two from Colombia, two from Paraguay, and five from Peru. All agree in being the same as *Centrocorisa kollarii* (Fieb.) from Brazil.

I consider, therefore, that we have two species of *Centrocorisa*: *Centrocorisa nigripennis* (Fabr.) typical of Insular America and *Centrocorisa kollarii* (Fieb.) typical of South America.

In Mexico we have both species, while in Costa Rica and Guatemala I have seen only *Centrocorisa kollarii* (Fieb.). In Mexico *Centrocorisa kollarii* (Fieb.) ranges from Chiapas in the south to Sonora and Chihuahua in the north. *Centrocorisa nigripennis* (Fabr.) extends from Campeche and Chiapas in the south, up through Hidalgo to Tamaulipas. Both species have been taken at La Libertad, Chiapas, on September 1, 1937, and January 1, 1938.

The two species may be separated as follows:

A. Left genital clasper of male broadly expanded at tip. Hemelytron of female without hair tufts on corium.......................... *C. nigripennis* (Fabr.)

AA Left genital clasper of male but slightly enlarged at tip. Hemelytron of female with a definite hair tuft or patch on corium near the nodal furrow and a linear strip of longer hairs on clavus near the distal third of the claval suture *C. kollarii* (Fieb.)

Centrocorisa nigripennis (Fabr.)

(Plate LXX, figs. 1, 1a-1c; wash drawing 13, Plate IV)

1803. *Sigara nigripennis* Fabricius, J. C. Systema Rhyngotorum, Brunsvigae, p. 105. (Types in Universitetets Zoologiske Museum, Copenhagen, from Insular America. Examined by Hungerford, 1928, and Jaczewski, 1939.)

1848. *Corisa cubae* Guérin-Méneville, F. E. Iconographie du Règne Animal de B. Cuvier. Part 7, p. 358, pl. 57, fig. 9. (Types in Museum National d'Histoire Naturelle, Paris, from Cuba. 4 ♀♀. Examined by Hungerford, 1928, and Jaczewski.)

1851. *Sigara nigripennis* Fabr. cited by Fieber *in* Species Generis Corisa. Prague Sep., p. 40. (Ref. only.)

1851. *Corisa kollarii* Fieber, F. X. Species Generis Corisa. Prague Sep., p. 17. (In part: those from Cuba, the types in Zoologisches Museum, Berlin. Examined by Lundblad, 1928, Hungerford, 1928.)

1851. *Corixa cubae* Guérin cited by Fieber *in* Species Generis Corisa. Prague Sep., p. 42, with Latin translation of Guérin's description.

1853. *Corixa irrorata* Herrick-Schaffer, G. A. W. Die Wanzenartigen Insecten. Nürnberg. Vol. IX, pp. 60-61. (Type in Zoologische Sammlung des Bayerischen Staates, Munich, from "Ins. Barthelemy." Examined by Jaczewski. 1939.)

1853. *Corixa cubae* Guérin, cited by Herrick-Schäffer. Die Wanzenartigen Insecten. Nürnberg. Vol. IX, Heft 8. Alph. Syn. Verz., p. 68. (Ref. only.)

1853. *Corisa irrorata* Herrick-Schäffer, G. A. W. Die Wanzenartigen Insecten. Nürnberg. Vol. IX, Heft 8. Alph. Syn Verz., p. 69. (Ref. only.)

1853 *Corisa kollari* Fieb. cited by Herrick-Schäffer *in* Die Wanzenartigen Insecten. Nürnberg. Vol. IX, Heft 8. Alph. Syn. Verz., p. 69. (Ref. only.)

1853. *Corisa nigripennis* (Fabr.) cited by Herrick-Schäffer *in* Die Wanzenartigen Insecten. Nürnberg. Vol. IX, Heft 8, Alph. Syn. Verz., p. 70. (Ref. only.)

1857. *Corisa cubae,* Sagra, Ramon de la. Historia Fisica, Politica y Natural de la Isla de Cuba. Secunda parte Historia Natural Tom. VII, p. 177. (Brief Latin translation of Guérin's description and additional notes in Spanish comparing this with *C. kollarii* and recording specimens from Martinique. (3 ♀♀ and 1 ♂ specimens in Museum National d'Histoire Naturelle, Paris, studied by Hungerford, 1928, later examined by Jaczewski, 1933, who called them cotypes.

1859. *Corixa nigripennis* Fabr cited by Dohrn *in* Catalogus Hemipterorum. Stettin, p. 55. (Ref. only—Cuba.)

1859. *Corixa cubae* Guérin, cited by Dohrn *in* Catalogus Hemipterorum. Stettin, p. 55. (Ref. only—Cuba.)

1868. *Corixa nigripennis,* Stal, C. Hemiptera Fabricana *in* Kongl. Svenska Vetenskaps-Akademiens Handlingar VII, p. 138. (Redescribes specimens from St. Barthelemy, probably Fabrician cotypes in Naturhistoriska Riksmuseum, Stockholm. Examined by Hungerford, 1928, Jaczewski, 1939.)

1886. *Corisa kollarii,* Uhler, P. R Check List of Hemiptera-Heteroptera of North America. Brooklyn, p. 28. (Ref. only. West Indies.)

1886. *Corisa cubae* Guérin cited by Uhler *in* Check List of Hemiptera-Heteroptera of North America. Brooklyn, p. 29. (Ref. only. West Indies.)

1886. *Corisa nigripennis* Fabr. cited by Uhler *in* Check List of Hemiptera-Heteroptera of North America. Brooklyn, p. 29. (Ref. only. West Indies.)

1894. *Corisa cubae,* Uhler, P. R. Proceedings Zoological Society London, p. 224. (From Island Grenada. His Florida and Texas records I cannot vertify from the Uhler collection.)

1899. *Corixa kollarii,* Kirkaldy, G. W. Entomologist, London, XXXII, p. 30. (Dist. Jamaica.)

1899. *Corixa kollarii,* Kirkaldy, G. W. Entomologist, London, XXXII, p. 194. (Dist. Guadaloupe Isl.)

1900. *Corixa kollarii,* Kirkaldy, G. W. Entomologist, London, XXXIII, p. 72. (Dist. Jamaica at lights.)

1901. *Corixa kollari,* Champion, G. C. Biologia Centrali-Americana, II, p. 377. (In part: The Grenada, Cuba and Veracruz records.)

1909. *Arctocorisa cubae,* Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Proceedings of the Entomological Society of Washington, X, p. 194. (Ref. only—Cuba.)

1909. *Arctocorisa irrorata,* Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proceedings of the Entomological Society of Washington, X, p. 195. (Ref. only—St. Barthelemy.)

1914. *Callicorixa kollarii,* Barber, H. G. Bull. American Museum of Natural History, N. Y., XXXIII, p. 497.

1917. *Callicorixa kollarii,* Van Duzee, E P. Catalogue of Hemiptera of America, North of Mexico. Univ. of Calif. Pub. Ent., Vol. II, pp. 477-478. (Refs. only. Dist. records in error.)

[illegible]. *Arctocorisa antiguensis* Torre-Bueno, J. R. de la. University of Iowa Studies in Natural History, X, No. 3, pp. 31-32. (Types in State University of Iowa, Iowa City, examined by Hungerford, 1925 (Jaczewski, 1931).

1926. *Callicorixa kollarii,* Blatchley, W. S. Heteroptera of Eastern North America. Indianapolis, Indiana, p. 1066. (Key, description and distribution) (Probably should have been omitted).

1928 *Centrocorisa kollari,* Lundblad, O. Entomologisk Tidskrift, XLIX, Häft 2, p. 68. (In part: proposes in footnote new generic name for.)

1929 *Centrocorisa kollari,* Lundblad, O. Archiv. für Hydrobiologie, XX, p. 311. (Describes the genus and examined Fieber's types in Zoologisches Museum, Berlin, from Cuba.)

1929. *Centrocorisa kollari,* Lundblad, O. Entomologiske Middelelser, XVI, pp. 277-280. Fig. 1 and Plate I. (Desc. specimens from St. Croix)

1931. *Centrocorisa kollari,* Jaczewski, T. Annales Musei Zoologici Polonici, IX, No. 10, p. 147. (In which he makes *Arctocorisa antiguensis* Bueno a synonym.)

1931 *Centrocorisa kollari,* Jaczewski, T. Annales Musei Zoologici Polonici, IX, No. 15, p. 196. (In part: the Insular specimens.)

1933. *Centrocorisa cubae,* Jaczewski, T. Annales Musei Zoologici Polonici, IX, No 21, pp. 336-337. (Studied what he called a "co-type" from Martinique in Paris Museum and says *C. antiguensis* (Bueno) is a synonym. However, Guérin described species in 1843 from Cuba. Martinique not mentioned until 1857.)

1933 *Centrocorisa cubae.* Jaczewski, T. Annales Musei Zoologici Polonici, X, No. 1, p. 5. (Records from Martinique, W. I.)

1936 *Centrocorisa cubae,* Hungerford, H B. Carnegie Institution of Washington, Publ No. 457, pp. 145-150.

1939 *Centrocorisa nigripennis,* Jaczewski, T Annales Musei Polonici, XIII, No. 23, pp 294-298 (In part).

1939. *Centrocorisa nigripennis,* Hungerford, H B Annals Entomological Society of America, XXXII, p. 588.

1939 *Callicorixa kollarii,* Millspaugh, Dick D Field and Laboratory, VII, No. 2, p. 83.

Size: Length 6 mm. to 8.2 mm.; width across the head 2.3 mm. to 2.94 mm.

Color: General facies light to medium brown. Pronotum crossed by 8 to 10 brown bands some of which may be broken or incomplete; its rear margin brown. The clavus with the basal transverse brown bands often furcate and narrower than the pale interspaces. The remainder of the clavus, corium and membrane covered with reticulate figures. That on the corium may be fused into longitudinal series. Embolar area dark to blackish in front of the nodal suture and whitish beyond. Venter yellow except that of male may be somewhat darkened.

Structural characteristics: Head of female broad and short as seen from above; vertex broad, less curved than the eyes; the synthlipsis broader than the eye. The male vertex obtusely angled but less so than in *C. kollarii* (Fieber). The facial impression not conspicuously obtusely angled above in the male. Both sexes with some fine white hairs on the front. The fourth antennal segment about one-half length of the third. No median carina on the pronotum. The pronotum and clavus lightly rastrate, remainder of hemelytra punctate, shining, and covered with short hairs. The female hemelytron without the hair tufts possessed by *C. kollarii* (Fieb.). The pruinose area of embolar groove posterior to nodal furrow short in both sexes but shorter in the female. The costal margin of embolium of female not indented but thickened in front of the nodal furrow. Mesoepimeron slender with osteole of scent gland not far from its tip. Metaxyphus long, rather large. Front femur pilose on anterior basal half and broadest beyond the middle. The tibia of the male with a flattened triangular prolongation. The pala of male as shown on Plate LXX. It bears two rows of pegs, the upper one of about 20 pegs, the lower one interrupted, about 12 or 13 pegs in the basal part and 8 setiform pegs in distal part. Middle and hind legs stout. Hind femur with a definite closely set row of short spines in the dorsal surface above the distal margin and many scattered on the ventral surface.

Middle leg: femur : tibia : tarsus : claws :: 100 : 51.5 : 29.9 : 44.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.2 : 126.4 : 52.9. Male asymmetry dextral, no strigil. Genital capsule as shown on Plate LXX, fig. 1a. The tip of the left clasper knob-like.

Comparative notes: C. nigripennis may be separated from *C. kollarii* by characters given in the key.

Location of types: The Fabrician types are two females in Copenhagen which I have seen.

Data on distribution: (Plate LXXII.) Originally described from Insular America. The following published records under various names apply to this species: Grenada, Barbados, Martinique, Guadaloupe, Antigua, St. Croix, Barthelemy, Jamaica, Cuba, and Veracruz, Mexico. I have before me for study specimens from the following places:

Grenada: Woburn (South End), H. H. Smith, 1 male.

Barbados, W. I.: May 16, 1918, D. Stoner, 1 female.

Antigua, W. I.: July 18, 1918, D. Stoner, 18 females, 3 males of type series of *C. antiguensis* Bueno.

Virgin Islands: Anagarda, V. I., III, 31, 1925 (A. M. N. H.), 1 male, 2 females.

Puerto Rico: Desengaño, Dec., 1923, 2 females, June, 1924, 2 females and 2 males (one of them with reversed asymmetry) (Cornell U. Lot 719). Arecibo, July 30-Aug. 1, 1914, 1 female (A. M. N. H.). Coamo Springs, Dec. 27, 1914, 2 females. Camuy, Isabela, May 12, 1935, Julio Garcia Diaz, 2 males, 17 females. Near Isabela, May 12, 1935, Julio Garcia Diaz, 32 males, 52 females. Cartagena Lagoon, Feb., 1935, 2 males. Cartagena Lagoon, Aug. 10, 1935, and Feb. 23, 1935, Julio Garcia Diaz, 26 males, 19 females. Mayaguez, Oct. 22, 1932, V. B. Diaz, 1 male, 1 female, and Dec., 1932, C. Antolin, 1 male. Tortuguero Lake, March 20, 1935, Julio Garcia Diaz, 2 males, 4 females and nymphs. Cabo Rojo, June 9, 1937, J. A. Ramos, 1 male.

Haiti: Port au Prince, Feb., 1925, G. N. Wolcott, 1 female.

Jamaica, B. W. I.: Claremont, Baron Hill, Trelawny, Feb., 1928, 3 males, 5 females; March 4, 1928; Nov. 12, 1928, 5 males, 13 females; L. G. Perkins, 7 males, 12 females. Claremont, Feb., 1928, Lilly G. Perkins, 4 females, 3 males. Lumsden, Tjdenham?, St. Ann, Stg. pond, 2, 1928, Lilly G. Perkins (8 males, 14 females). April 20, 1909, A. E. Wright (Cambridge Mus., 1 female). Jamaica, H. G. Klages (det. *C. kollarii* Fieb. by Kirkaldy), female (Kirk. Coll.). Jamaica, Aug. 5 (Uhler Coll.), 2 males, 3 females, 1 nymph.

Trinidad, B. W. I.: Trinidad, Oct. 27-29, 1938, C. J. Drake (Drake Coll.), 1 male, 2 females. Jamaica, Nov. 7, 1 male, 2 females. Montego Bay, March 15, 1911 (A. M. N. H.), 1 female. Jamaica (U. S. N. M.), 3 males, 3 females, 2 nymphs. Mandeville, 4-12-1937, Chester Roys, small pond, 2,000 ft. elev., 17 males, 23 females. Spanish Town, 4-10-1937, Chester Roys, 1 female.

Cuba: Cataline, Cuba, Havana Prov., Nov. 27, 1933, P. J. Bermudez, 5 female (K. U. Col.). Matanzas, Yum? Valley, Dec. 9, 1933, P. J. Bermudez, 1 male (K. U. Col.). Matanzas Río Canima, Dec. 12, 1933, P. J. Bermudez, 1 female (K. U. Col.). Jutrica Alto Songo, Nov. 9, 1924 (A. M. N. H.), 3 males, 3 females. Cayamas, E. A. Schwarz, 2 females (U. S. N. M.). Guanajay, May 3, Palmer and Riley, 1 female (U. S. N. M.). Cuba (Uhler Coll.), 2 females, 1 male. Cuba (Cambridge), 1 female. Havana, Cuba, C. F. Baker, 1 male. Cuba, Ch. Wright (Cambr.), 1 male. Santiago de las Vegas, Cuba, Dec. 10, 1922, 1 female. Santiago de las Vegas, Cuba, Sept. 5, 1923, S. C. Bruner, 2 females, 1 male. Santiago de las Vegas, Cuba, Oct. 31, 1922, 1 female.

Mexico: Mex. Col. Signoret, 1 female. *Yucatán:* Yunca Aguada, July 29, E. P. Creaser. *Campeche:* Palizada, Sept. 15, 1936, H. D. Thomas, 2 males, 3 females; Champotón, Yalic Aguada, July 14, E. P. Creaser. *Chiapas:* Comitán, Aug. 30, 1937, H. D. Thomas, 6 females; Comitán, Jan. 18, 1938, 1,800 M., Oct. Utrilla L., 3 males, 6 females; Tepanquapan, Oct. 28, 1937, H. D. Thomas, 2 males, 3 females; Lake Tepanquapan, Aug. 29, 1937, H. D. Thomas, 2 males, 1 female; Hda. La Libertad, Sept. 1, 1937, H. D. Thomas, 1 female; La Libertad, Jan. 1, 1938, Octavio Utrilla L., 500 m. a. s. l., 4 males, 4 females. *Hidalgo:* Agua Fría, July 28, 1937, 5 males, 11 females; Nov. 4, 1938, H. D. Thomas, 3 males, 6 females; Agua Fría, Aug. 27, 1944, Henry Thomas, 1 male, 1 female; *Tamaulipas:* San Carlos Mts., San José, July, 1930, Dice Bartlett, 1 male, 1 female; 5 m. s. Ciudad Victoria, Nov. 5, 1936, H. D. Thomas, 1 male, 1 female.

U. S. A.: *Texas:* Alfred, July 24, 1928, R. H. Beamer, 1 female.

Centrocorisa kollarii (Fieb.)

(Plate LXX, figs 2, 2a-2d)

1851 *Corisa kollari* Fieber, F. X. Species Generis Corisa. Prague Sep., p. 17, Pl. I, fig. 7. (Types from Brazil in Naturhistorisches Museum Examined by Hungerford, 1928.)

1859. *Corixa kollarii* Fieber cited by Dohrn, *in* Catalogus Hemipterorum Stettin. (Ref. only.)

1899. *Corixa kollarii,* Kirkaldy, G. W. Bolletino Musei di Zoologia ed Anatomia Comparata, Turino, XIV, No. 347, pp. 1-2. (Dist. Ecuador, Bolivia.)

1899 *Corixa* (*Callicorixa*) *kollarii,* Kirkaldy, G. W Bolletino Musei di Zoologia ed Anatomia Comparata, Turino, XIV, No. 350, pp. 7-8, figs. 3-4-5. (Specimens from Ecuador described.)

1899. *Corixa kollarii,* Kirkaldy, G. W. Bolletino Musei di Zoologia ed Anatomia Comparata, Turino, XIV, No 352, p. 1. (Dist. "Caiza.")

1901. *Corixa kollari,* Champion, G. C. Biologia Centrali-Americana, Vol. II, p. 377. (In part: The Presidio de Mazatlan record.)

1909. *Callicorixa kollarii,* Kirkaldy, G. W , and Torre-Bueno, J. R. de la Proc. Ent. Soc. Washington, X, p. 194. (In part: The South American records.)

1925. *Corixa* (*Callicorixa*) *kollarii,* Campos. Rev. Col. Nac. Nicente Rocafuerte, Guayaquil, VII, p. 44 (Quot.).

1928. *Centrocorisa kollari,* Lundblad, O. Entomologisk Tidskrift, XLVIII, Haft 4, p 223. (Refers to Kirkaldy, 1899.)

1928 *Centrocorisa kollari,* Lundblad, O. Entomologisk Tidskrift, XLIX, Haft 2, p. 18, footnote. (In part· proposes new generic name.)

1929 *Centrocorisa kollari* var. *dispar* Lundblad, O Entomologiske Meddelelser Kobenhavn, XVI, pp 281-283, figs 2-5, Pl. I (Types in Universitetets Zoologiske Museum, Copenhagen from Colombia.)

1930. *Centrocorisa kollari.* Jaczewski, T. Mitteilungen aus dem Zoologischen Staatsinstitut und Zoologischen Museum in Hamburg, XLIV, p. 145, fig. 4 (From Costa Rica, probably this species)

1931. *Centrocorisa kollari,* Jaczewski, T. Annales Musei Zoologici Polonici, IX, No. 15, p. 196, Pl. XXV, fig. 11. (Mexico, probably this species)

1939. *Centrocorisa kollari* var *dispar,* Jaczewski, T. Annales Musei Zoologici Polonici, XIII, No. 23, p. 296. (In part.)

Size: Length: 5.88 mm. to 7.56 mm.; width across head: 2.1 mm. to 2.94 mm. The males on the average smaller than the females. A broad, compact species.

Color: General facies medium brown. Pronotum crossed by 7 to 9 brown bands, some of which may be broken or incomplete, its rear margin brown. The clavus with the basal transverse brown bands often furcate and narrower than the pale interspaces. The remainder of clavus, corium and membrane covered with reticulate figures. Embolar area usually blackish in front of the nodal furrow and whitish beyond. Venter yellow except that of male may be somewhat darkened.

Structural characteristics: Head of female broad and short as seen from above; the vertex broad, less curved than the eyes; the synthlipsis broader than the eye. The male vertex obtusely angled; the facial impression obtusely angled above in the male. Both sexes with some fine white hairs on the front. The fourth antennal segment not quite half the length of the third. No median carina on pronotum. The pronotum and clavus lightly rastrate, remainder of hemelytra punctate, shining, and covered with short hairs. The female hemelytron with a definite hair tuft or patch on the corium near the nodal furrow and a linear strip of longer hairs on the clavus near the distal third of the claval suture. The pruinose area of embolar groove posterior to nodal furrow short in both sexes but almost at end of embolar groove in the female. The costal margin of embolium of female broadly indented and thickened in front of nodal furrow. Mesoepimeron slender with osteole of scent gland not far from its tip. Metaxyphus long, rather large. Front femur pilose on anterior basal half and broadest beyond the middle. The tibia of the male with a flattened triangular prolongation. The pala of male as shown on Plate LXX. It bears two rows of pegs, the upper one of about 20 pegs, the lower one interrupted, about a dozen pegs in the basal part and eight setiform pegs in distal part. Middle and hind legs stout. Hind femur with an irregularly set row of short spines on the dorsal surface above the distal margin and many scattered on ventral surface. Middle leg: Femur : tibia : tarsus : claws :: 100 : 53.8 : 33.8 : 46.1. Hind leg: Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 94.4 : 123 : 51.5. Male asymmetry dextral, no strigil. Genital capsule as shown on Plate LXX, the tip of the left clasper not knob-like.

Comparative notes: This species may be separated from *C. nigripennis* by characters given in the key.

Location of types: Fieber wrote "Habitat in Brasilia (Mus. Vienn.) Insula Cuba (Mus. Berol.)." The specimens in Vienna labeled "Natterer Brasilien" should be considered the types and I select a male and female as the lectoholotype and lectoallotype.

Data on distribution: (Plate LXXII.) Originally described from Brazil and Cuba, a mixture of two species, those from Cuba being *C. nigripennis* Fabr. The following published records apply to this species: Brazil, Bolivia, Ecuador, Venezuela ?, Costa Rica, Mexico: Colima and Presidio de Mazatlan. I have before me for study specimens from the following places:

Brazil: "Natterer Brasilien," "Kollari det Fieber," 1 male. "Brasilien Cuming 847", "Kollari det Fieber", 2 females. Custodia Pernambuco, Lat. 8, Long. 38, No. 5462, Stillman Wright, 5 males, 3 females. Belem, Pernambuco, Lat. 9, Long. 39, No. 643, Stillman Wright, 2 males, 2 females.

Paraguay: Villarrica Coraveni, Jan. 8, 1923, Schade, 2 males, No. 28168. Molinasque Dept. Caruga, Oct., 1925, F. Schade, 5 males, 1 female.

Bolivia: "Dr. Borelli" determ. *C. kollarii* by Kirk., 1899, and marked cotype of his paper.

Perú: Vic. Rioja, Dept. San Martin, 900 m. a. s. 1, Sept. 9-Oct. 3, 1936, F. Woytkowski, No. 3682, 1 male. Vic. Guayabamba, Dept. Amazonas, Andes, 3,000 m. a. s. l., ponds and pools, Aug. 14-19, 1936, F. Woytkowski, No. 3668, 1 male. Prov. Tarma, Dept. Junia, Palmapata Jungle, 1,400 m. a. s. l., October 10-20, 1940, F. Woytkowski, No. 408. Vic. Chachapoyas, Dept. Amazonas, Andes, 2,000 m. a. s. l., Aug. 4-10, 1936, F. Woytkowski, No. 3671, females (hair patches), Vic. Guayabamba, Dept. Amazonas, Andes, 1,300 m. a. s. l., Aug. 14-19, 1936, bogs and pools, No. 3667, F. Woytkowski, 13 males, 2 females (hair patches). Vic. Guayabamba, Dept. Amazonas, Andes, 1,300 m. a. s. l., Aug. 14, 1936, bogs and pools, No. 3665, F. Woytkowski, 35 males, 49 females.

Ecuador: "La Concepción, Valle del Mira," Turin Museum, marked cotype of his paper by Kirkaldy, 3 females.

Colombia: Bogotá, Coll. Signoret, 2 females. Cali, Colombia, from W. F. H. Rosenberg, 3 females. Villavieja, 1944, R. A. Stirton, 3 males, 1 female.

Costa Rica: Río Virilla, Dec. 26, 1931, Heinrich Schmidt, 42 males, 24 females. San José, Heinrich Schmidt, 1932, 2 males, 8 females. San José, Heinrich Schmidt, 1932, 8 males, 29 females. San José, Heinrich Schmidt, June and July, 1931, 7 males, 22 females. San Isidro del Gen., 2,000 ft., Feb., 1939, Dean L. Rounds, 3 males.

Guatemala: Los Amatas, Kellerman (Cambr. 2 males, 2715, 1 female, has hair patches).

MEXICO: *Chiapas:* Ocozocoautla, Aug. 3, 1937, H. D. Thomas, 7 males, 13 females; La Libertad, Jan. 1, 1938, Octavio Utrilla L., 500 M. above sea, 30 males, 39 females; San Vicente, Jan. 4, 1938, Oct. Utrilla L., 12 males, 5 females; Hda. La Libertad, Sept. 1, 1937, H. D. Thomas, 28 males, 29 females; La Libertad, Jan. 1, 1938, Octavio Utrilla L., 500 m. a. s. l., 11 males, 12 females.

Guerrero: Ocotito, Kl. 363, S. of Mex. City, Nov. 2, 1936, H. D. Thomas, 1 female; Río Agua, Kl. 437, S. of Mex. City, Oct. 31, 1936, H. D. Thomas, 4 males, 6 females; Río Balsas, Kl. 259 S. of Mex. City, Oct. 31, 1936, H. D. Thomas, 4 females; Acapulco, Aug. 22, 1938, H. D. Thomas, 4 males, 5 females; Acapulco, Kl. 444 S. of México City, Oct. 7, 1938, H. D. Thomas, 15 males, 9 females; Tierra Colo., Kl. 377 S. of México City, Oct. 31, 1936, H. D. Thomas, 1 male; La Sabana, Kl. 226 S. of México City, Oct. 20, 1936, H. D. Thomas, 1 male; Iguala, Oct. 7, 1936, H. D. Thomas, 1 male.

Morelos: Cuernavaca, Oct. 5, 1936, H. D. Thomas, 1 male.

Jalisco: Mazatlán, May 1, 1934, H. Hinton, 4 males, 6 females.

Sonora: Salitial, Río Mayo, Feb. 23, 1935, H. S. Gentry, 1 male, 2 females.

Chihuahua: Carimechi, Río Mayo, Jan. 6, 1935, H. S. Gentry, 2 males.

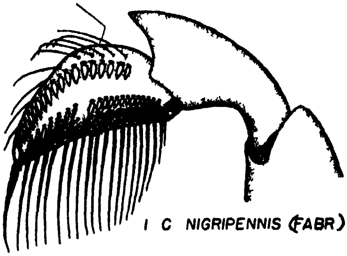
Lower California: Triunfo, July 7, 1938, Michelbacker and Ross (Calif. Acad.); 20 miles N. of Comondú, July 23, 1938, Michelbacker and Ross (Calif. Acad.)

PLATE LXX

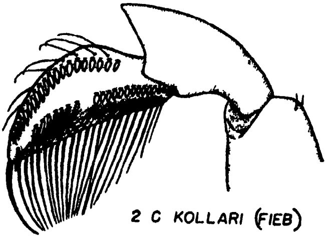
Centrocorisa Lundblad

FIG. 1. *Centrocorisa nigripennis* (Fabricius); pala of male
FIG. 1a. Genital capsule of male.
FIG. 1b. Left hemelytron of female.
FIG. 1c. Dorsal view of male abdomen.
FIG. 2. *Centrocorisa kollarii* (Fieber); pala of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Left hemelytron of female.
FIG. 2c. Dorsal view of male abdomen.
FIG. 2d. Left hemelytron of female, showing hair patches.

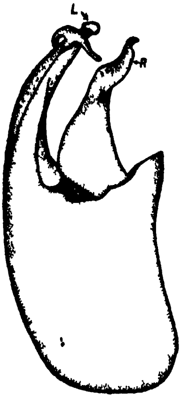
PLATE LXX



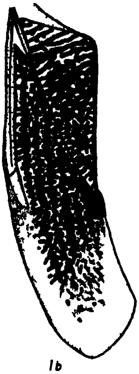
1 C NIGRIPENNIS (FABR)



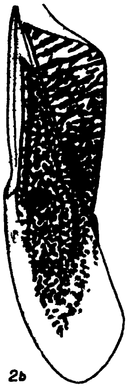
2 C KOLLARI (FIEB)



1a



1b



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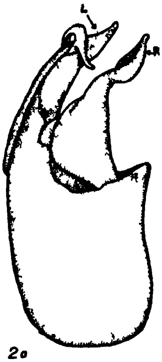
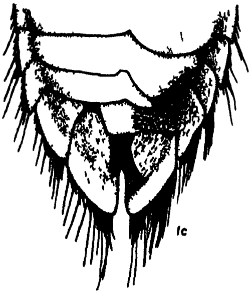


2a



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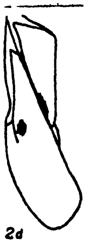
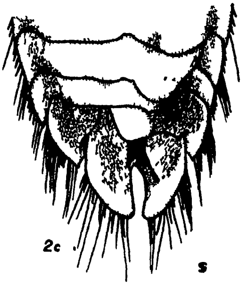


2d



2c

CENTROCORISA LUNDBL.

S

Ramphocorixa Abbott

1912. Abbott, J. F. Canadian Entomologist, LXIV, p. 120. (New genus for *R. balanodis* n. sp.)

1917. Van Duzee, Edward P. Catalogue of the Hemiptera of America North of Mexico, p. 478.

1920. Hungerford, H. B Kansas University Science Bulletin XI, p. 212.

1926. Blatchley, W. S. Heteroptera or True Bugs of Eastern North America, p. 1067.

1928 Jaczewski, T. Annales Musei Zoologici Polonici, VII, pp. 55, 58.

1935 Poisson, R. Archives de Zool Exp. et Gén., LXXVII, p. 458.

1945. Griffith, M. E. Kansas University Science Bulletin, XXX, Pt. II, pp. 241-365.

Moderately small corixids having a short pronotum that is broadly rounded behind and in museum specimens conspicuously exposes the apex of the scutellum. Pronotum and clavus finely rastrate. Color pattern often effaced, but when distinct with about six brown bands on pronotum, and reticulations of hemelytra in longitudinal, but often faint, series. An unpigmented field always present on basal part of clavus. Lateral lobe of prothorax lingulate. The palar claw serrated on basal half in both sexes.* The infraocular space narrow and the hypo-ocular suture short. The embolar groove long, the pruinose area posterior to nodal furrow nearly one-half as long as the cubital ridge. The pruinose area of claval suture is long and lies mostly on the claval side. The distal half of costal margin anterior to nodal furrow more or less flattened and shining in females as seen from lateral view. The males characterized by a distinct carina on the anterior portion of vertex, by a deep cleft on dorsal margin of pala, by a dextral abdominal asymmetry, and by a small strigil which consists of a single comb. Genotype *R. acuminata* (Uhler).

The two species may be distinguished as follows:

A. Vertex of male strongly keeled and prominently produced Female usually lacking conspicuous pigmentation on abdominal venter .. ..*R. acuminata* (Uhler)

AA. Vertex of male not as above. Female typically marked by brown or black on the sides of the last two or three ventral abdominal segments.
R. rotundocephala Hungerford

Ramphocorixa acuminata (Uhler)

(Plate LXXI, figs. 1, 1a-1e, wash drawings 17 and 18, Plate V)

1897. *Corixa acuminata* Uhler, P. R. Trans. Maryland Acad. Sci. (Baltimore) I, p. 392.

1904. *Corisa scutellata* Crevecoeur, F F. Trans Kans Acad. Sci. XIX, p. 284 (in stock pond, Mar.-Oct.)

1912. *Ramphocorixa balanodis* Abbott, J. F. Canadian Entomologist XLIV, p. 118-120, plate IV. (Describes as new genus, new species and records eggs on crayfish and gives life history.)

1912. *Ramphocorixa balanodis*. Abbott, J. F. American Naturalist XLVI, pp. 553-555. (Symbiotic relation between a water bug and a crayfish.)

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* Often discernible only under low power compound microscope.

1917. *Ramphocorixa acuminata*, Hungerford, H. B. Jl. New York Ent. Soc., XXV, p. 114.

1920. *Ramphocorixa acuminata*, Hungerford, H. B. Kansas University Science Bull. XI, p. 215-221. (Kansas—new record.)

1920. *Ramphocorixa acuminata*, Torre-Bueno, J. R. de la. Bull. Brooklyn Ent. Soc., XV, p. 88. (Says *R. balanodis* Abbott is syn.)

1923. *Ramphocorixa acuminata*, Hungerford, H. B. Bull. Brooklyn Ent. Soc. XVIII, p. 13.

1925. *Ramphocorixa acuminata*, Hungerford, H. B. Ent. News XXXVI, p. 264.

1926. *Ramphocorixa acuminata*, Blatchley, W. S. Heteroptera or True Bugs of Eastern North America, pp. 1067-1068.

1927 *Ramphocorixa acuminata*, Hungerford, H. B. American Mus Novitates No. 278. (Figs. head, pala and male capsule.)

1931. *Ramphocorixa acuminata*, China, W E. Nat Hist Mag. III, p 60.

1931. *Ramphocorixa acuminata*, Jaczewski, T Annales Musei Zool. Polonici IX, No. 15, p. 194. Plate XXV, figs. 7-10, Plate XXIX, fig. 6. (Records from Mexico and adds to description)

1939 *Ramphocorixa acuminata*, Millspaugh, Dick D. Field and Laboratory VII, No. 2, pp. 83-84.

1945. *Ramphocorixa acuminata*, Griffith, M. E Kansas Univ. Sci. Bull. XXX, Pt II, pp. 241-365, Pls. XVI-XXVIII. (An ecological and morphological study.)

1947 *Ramphocorixa acuminata*, Pennak, R W. Keys to the Aquatic Insects of Colorado. Univ of Colo Studies, Series D, Vol. 2, No. 3, p 363.

Applying to the above species also·

1876. *Corixa alternata*, Forbes, S A Bull. Ill Mus. of Nat. Hist. 1, pp. 4, 5

1878 *Corixa alternata*, Forbes, S A. Amer Nat, XII, p 820 (Eggs on crayfish)

1920 *Corixa scutellata* C V R , Torre-Bueno, J. R de la Bull Brookl Ent Soc XV, pp. 88 (Records specimens under this label in U. S. N. M.)

Size: Length 5 mm. to 5.5 mm.; width across the head 1.47 mm. to 1.85 mm.

Color: General facies pale; grayish to smoky brown; pattern usually partially to completely effaced; when present, the restricted pronotal disk is margined by brown and crossed by four nearly straight brown bands, the anterior ones often faint; clavus nearly transparent, margined with brown, about one-third of its area adjacent to the scutellum immaculate; a few complete markings beyond the middle; corial lines confusedly interrupted or obsolescent, fusing to form three delicate vermiculated longitudinal stripes that continue upon the membrane. Head, legs and venter white to yellowish. The abdominal venter of the male with a broad black submarginal band on either side extending over the third, fourth and fifth sternites.

Structural characteristics: Head of female broadly rounded as seen from above while that of the male is strongly produced and strongly carinate; postocular space very narrow; interocular space equal to the width of an eye; facial impression of female shallow, that of male broad, deep, acorn-shaped, occupying the entire space between the eyes and reaching from the beak to the acute termination of the carina above; foveal surface clothed with fine appressed hairs; the relative length of the antennal segments are as follows:

1 : 2 : 3 : 4 :: 20 : 13 : 35 : 24. Pronotal disk somewhat restricted, lenticular, its posterior margin evenly rounded, exposing the tip of the scutellum, rastrate. Hemelytra often semihyaline, the corium clothed with sparse, fine appressed whitish hairs and the basal half of clavus rastrate; pruinose area of embolar groove posterior to nodal furrow : cubital ridge :: 1 : 2, and equal to the long, slender pruinose area along the claval suture. Mesoepimeron slender, the osteole of the scent gland just laterad to its tip. Metaxyphus short, triangular. The front leg of the male has the pala deeply cleft on its dorsal margin and a sigmoid row of about 18 pegs. The middle leg: Femur : tibia : tarsus : claw :: 100 : 82.5 : 39 : 58. Hind leg: Femur : tibia : tarsus 1 :: tarsus 2 :: 100 : 100 : 114 : 57. Sometimes one or two small pegs on the shining dorsal surface of the femur and a few scattered pegs on the ventral surface—difficult to see. Male abdomen and genital capsule as shown on Plate LXXI.

Comparative notes: The characters given in the key on page 448 will separate this species from *R. rotundocephala* Hungerford.

Location of types: In the Uhler collection of the U. S. N. M. we find four males and two females labeled "Tex." One of the males bears Uhler's label "*Corixa acuminata.*" There are also two females labeled "Ill." and a male labeled "Normal, Ill." These nine specimens represent the type series. We are selecting a lectoholotype and a lectoallotype from this series and labeling the others "cotypes."

Data on distribution: (see Plate LXXII.) We have seen the following specimens:

U. S. A.: *Washington, D. C.:* 1-10, 3 males, 1 female. (In Heidemann Coll. labeled *Corixa scutellata* at Cornell Univ.)

Ohio: Prentiss, July 17, 1916, C. J. Drake (Drake Coll.), 1 male.

Illinois: Olive Branch, Sept. 5, 1923, Owen Bryant (Bryant Coll.) 2 males, 2 females; Normal, C. V. Riley, (Mich. Coll.) 14 females; Murphysboro, Aug. 9, 1932, W. J. Gerhard (Field Mus. Coll.), 1 male, 2 females.

Minnesota: St. Paul, Elks Golf Club Pond, July 14, 1921, H. B. Hungerford, 7 males, 9 females.

S. Dakota: Brookings, July 29, 1942, light trap, N. P. Larson (Severin), 2 males, 5 females.

Missouri: St. Louis, Oct., 1911, 1 male, 1 female; Columbia, July 1909; Agricultural College, May 5, 1919 (Parshley Coll.), 3 females.

Kansas: To be found in pasture ponds throughout the state. (See Griffith's paper.)

Colorado: Hadley, P. A. Readio, Sept. 22, 1927, 1 female.

N. Mexico: Wagonmound, July 18, 1926, M. B. Jackson, 2 females.

Oklahoma: Tulsa Co., Grace Wiley, March 16, 1922, 1 male, 1 female; Ardmore, April 14, 1923, H. B. Hungerford, 3 males, 22 females.

Mississippi: Lauderdale, July 17, 1930, R. H. Beamer, 2 males, 9 females; Ocean Springs, C. J. Drake (Drake), July 29, 1921, 1 female; Vicksburg, 3 males, 4 females; July 19, 1921, C. J. Drake (Drake); Woodville, July 26, 1921, 2 males, 5 females; Scooba, July 17, 1930, R. H. Beamer, 1 female.

Alabama: Crawford, P. W. Oman, July 24, 1930, 1 female.

Georgia: Baker Co., Dec. 23, 1946, L. W. Morgan, 4 females.

Texas: (See Griffith's paper.)

MEXICO: Jaczewski, 1928, recorded this species from Ocotlán and Tizapá, Jalisco. We have before us the following:

Veracruz: West of Jalapa 15 klm., July 18, 1937, H. D. Thomas, 1 male, 1 female.

Michoacán: 20 miles east of Zitácuaro, Oct. 28, 1938, H. D. Thomas, 2 males, 3 females; Carapo, Sept. 2, 1938, H. D. Thomas, 3 females; Pátzcuaro, Aug. 31, 1938, H. D. Thomas, 1 female; Morelia, Sept. 3-4, 1938, H. D. Thomas, 25 males, 32 females; Zamora, Sept. 8, 1938, H. D. Thomas, 3 males, 9 females; Zacapú, Sept. 9, 1938, H. D. Thomas, 1 female.

Tamaulipas: San José, April, 1910 (Mich. Coll.), 3 females.

Jalisco: 20 mi. S. of Guadalajara, Sept. 10, 1938, H. D. Thomas, 4 males; Guadalajara, Tequilla road, 28 miles north of Jalisco, Sept. 13, 1938, H. D. Thomas, 5 males, 1 female; Tecolotlan, Sept. 15-17, 1938, H. D. Thomas, 1 male, 5 females; 20 miles W. of Tecolotlan, Sept. 16, 1938, L. J. Lipovsky, 4 females; Unión de Tula, Sept. 16, 1938, H. D. Thomas, (taken with *R. rotundocephala* Hungfd.).

Aguascalientes: 5 mi. S. of Aguascalientes, July 16, 1934, Smith and Dunkle, 1 female; Aguascalientes, Aug. 9, 1944, Henry Thomas, 11 males, 14 females.

San Luis Potosí: Km. 447 on road to Loredo, near Valles, No. 42, Sept. 28, 1938, H. D. Thomas, 5 females; 11 mi. E. of San Luis

Potosí, July 7, 1944, H. D. Thomas, 3 males, 1 female; 20 mi. W. of San Luis Potosí, July 8, 1944, H. D. Thomas, 6 females.

Hidalgo: Agua Fría, near Jacala, July 28, 1937, H. D. Thomas, 3 females; Real del Monte, Sept. 23, 1938, No. 29, H. D. Thomas, 1 male, 2 females.

Puebla: Tehuacán, July 18-25, 1937, H. D. Thomas, 19 males, 15 females; Cacaloapan, July 22, 1937, H. D. Thomas, 11 males, 11 females.

Ramphocorixa rotundocephala Hungerford

(Plate LXXI, figs. 2, 2a-2e)

1927. *Ramphocorixa rotundocephala* Hungerford, H. B. American Museum Novitates No. 278.

1945. *Ramphocorixa rotundocephala,* Griffith, M. E. Kansas Univ. Science Bull., XXX, Pt II, pp. 254, 255, 256, 258, 300.

Size: Length 5 mm. to 5.7 mm.; width across the head 1.57 mm. to 1.8 mm.

Color: General color pattern like that of *R. acuminata* (Uhler) that show striping. The dark stripes are more densely pigmented in this species than in many *R. acuminata* (Uhler). The tendency for the color pattern to be effaced not so marked. The pigmented portion of the pronotum is restricted and margined by a brown line, four or five cross bands can be recognized. A large white or yellow field on the base of each clavus; embolium white, distal half of clavus and all of corium finely longitudinally striped; the brown stripes narrow and irregularly pectinate; five of them on the corium including the margins; membrane irrorated. Head, legs and thorax white to yellow. Sides of abdominal venter of males with broad submarginal black band on either side and females usually with infuscations to black bands on at least the last ventral abdominal segment.

Structural characteristics: Head of female broadly rounded as seen from above, that of the male also rounded, not strongly produced or strongly keeled as in *R. acuminata* (Uhler); front two-fifths of vertex with a low longitudinal median ridge beginning at apex of frontal fovea; interocular space equal to the width of an eye; facial impression of female shallow, that of the male concave and extending from the beak to the termination of the carina above; foveal surface clothed with fine appressed hairs. The relative length of the antennal segments are as follows: 1 : 2 : 3 : 4 :: 17 : 12 : 31 : 18 (male). Pronotal disk somewhat restricted, its posterior margin evenly rounded, exposing the tip of the scutellum; rastrate.

Hemelytra sometimes semihyaline, the corium clothed with fine appressed whitish hairs and basal half of clavus rastrate, pruinose area of embolar groove posterior to nodal furrow : cubital ridge :: 1 : 2, and equal to the long slender pruinose area of the claval fold. Mesoepimeron slender, the osteole of the scent gland just laterad to its tip. Metaxyphus short, triangular. The front leg of the male has the pala deeply cleft on its margin nearer the base than in *R. acuminata* (Uhler) and the peg row not curved at the base. (See Plate LXXI.)

The middle leg: Femur : tibia : tarsus : claws :: 100 : 65.4 : 38.5 : 67 (♂). The hind leg: Femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100 : 127 : 72 (♂). Sometimes one or two pegs on the shining dorsal surface of the femur and a few scattered pegs on the ventral surface—difficult to see. Male abdomen and genital capsule as shown on Plate LXXI.

Location of types: Described from a male collected by F. E. Watson at Manville, *Haiti*, Feb. 6-10, 1922, at about 60 feet altitude. Holotype property of the American Museum of Natural History. Three imperfect specimens from *Cuba* (1 male, 2 females) that came from the P. R. Uhler collection which will be sent to the U. S. N. M. at Washington. One of these is labeled the allotype, the other two paratypes.

Comparative notes: See the key after the generic description above. This species appears to have a more constant color pattern than *R. acuminata* (Uhler) and the females that lack the black on their ventral abdominal segments can be distinguished from Uhler's species because they have the first tarsal segment of the hind leg relatively longer. The males are separated readily by the head and pala as seen on Plate LXXI. The shining flattened area of the hemelytral margin, in the females, is broader in *R. acuminata* (Uhler) than in *R. rotundocephala* Hungerford.

Data on distribution: (Plate LXXII.) Besides the Haiti and Cuba records above, we have in the Francis Huntington Snow Collections at the University of Kansas the following:

PUERTO RICO: Near Isabela, May 12, 1935, Julio Garcia Diaz, 14 males, 48 females.

MEXICO: *Chiapas,* Ocozocoautla, Sept. 3, 1937, H. D. Thomas, 7 males, 13 females; Comitán, Aug. 30, 1937, H. D. Thomas, 13 males, 40 females; Lake Tepancuapan, Aug. 28, 1937, H. D. Thomas, 1 male.

Veracruz: Santa Lucrecia, Nov. 9, 1932, Doctor Dampf, 1 male, 1 female.

Sinaloa: Mazatlán, May, 1934, H. Hinton, 1 male, 1 female.

Sonora: Salitial, Río Mayo, Feb. 23, 1935, H. S. Gentry, 1 male, 1 female.

Jalisco: Unión de Tula, Sept. 16, 1938, H. D. Thomas. [Taken with *R. acuminata* (Uhler)].

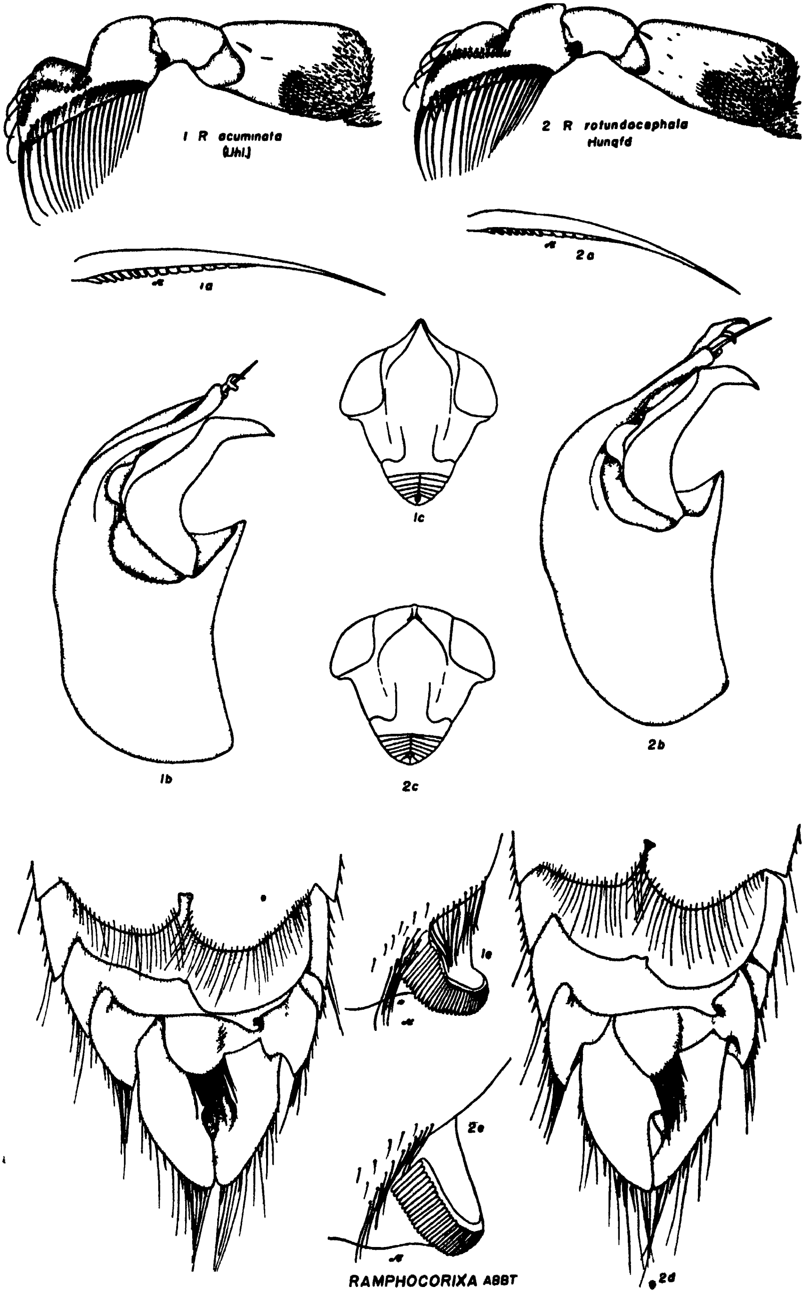
U. S. A.: *Arizona:* Baboquivari Mts., Aug. 24, 1941, Burton Hodgden, 1 male, 1 female; Baboquivari Mts., July 18, 1932, R. H. Beamer, 5 males, 1 female; Ruby, July 27, 1932, R. H. Beamer, 1 male, 1 female.

PLATE LXXI

Ramphocorixa Abbott

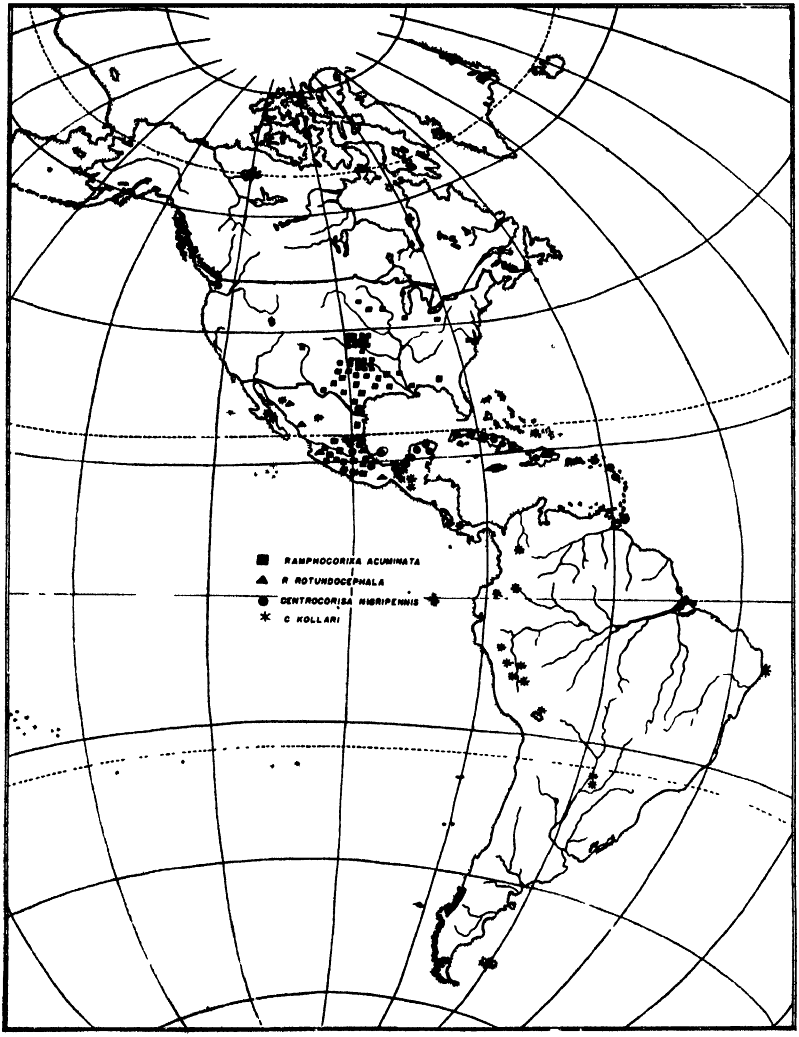
FIG. 1. *Ramphocorixa acuminata* (Uhler); front leg of male.
FIG. 1a. Enlargement of claw of male pala.
FIG. 1b. Genital capsule of male.
FIG. 1c. Frontal view of head of male.
FIG. 1d. Dorsal view of male abdomen.
FIG. 1e. Enlargement of strigil.
FIG. 2. *Ramphocorixa rotundocephala* Hungerford; front leg of male.
FIG. 2a. Enlargment of claw of male pala.
FIG. 2b. Genital capsule of male.
FIG. 2c. Frontal view of head of male.
FIG. 2d. Dorsal view of male abdomen.
FIG. 2e. Enlargement of strigil.

PLATE LXXI



RAMPHOCORIXA ABBT

PLATE LXXII


■ RAMPHOCORIXA ACUMINATA
▲ R ROTUNDOCEPHALA
● CENTROCORISA NIGRIPENNIS
✱ C KOLLARI

Callicorixa B. White

1873. White, F. Buchanan. The Ent. Mo. Mag. X, pp. 62 and 75 (new subg. of *Corixa* for *C. praeusta* and 6 others).

1879. Puton, A. Synopsis des Hémiptères Hétéroptères de France I, p. 282 (subg. *Callicorisa*).

1894. Wallengren, H. D. J. Ent. Tidskrift XV, p. 187 (subg. *Callicorisa*).

1898. Kirkaldy, G. W. Ent. XXXI, p. 253 (names *praeusta* type).

1901. Kirkaldy, G. W. Jl. Quekett Micros. Club., ser. 2, No. 48, p. 40. (Subg. of *Corixa*.)

1906. Kirkaldy, G. W. Trans. Amer. Ent. Soc. XXXII, p. 152 (as genus).

1908. Kirkaldy, G. W. Can. Ent. XL, p 117.

1909. Kirkaldy, G. W., and Torre-Bueno, J R. de la. Catalogue *in* Proc. Ent. Soc. Washington X, p. 193.

1917. Van Duzee, E. P. Catalogue of the Hemiptera of Amer. . . . , p. 477 (as genus).

1923. Abbott, J. F *in* Guide to the Insects of Connecticut, Pt IV. The Hemiptera or Sucking Insects of Connecticut, p. 390.

1924. Jaczewski, T. Annales Zoologici Musei Polonici Historiae Naturalis III, pp. 29-36 (included *Arctocorisa* Wallengren).

1926. Blatchley, W. S. Heteroptera of Eastern North America, pp 1065-1066.

1927. Lundblad, O. Ent. Tidskrift, XLVIII, Häft 2, pp 57-97, Pls I-VII (*Callicorixa st. s.* as a genus).

1929. Jaczewski, T Annales Musei Nationalis Hungarici, XXVI, p 33 (*Callicorixa* syn. of *Sigara st. s.*).

1930. Jones, H. P. The Entomologist's Record, Vols. XL-XLII; reprint, p 76. (*Callicorixa* as subg. of *Sigara*.)

1935. De Carlo, José. Revista Chilena de Historia Natural, p. 108

1935. Poisson, R Archives de Zool. Exp. et Gén., LXXVII, p. 504

1935. Hedicke, H Tierwelt Mitteleur, Leipzig 4, i. Tiel 3 Lief. X, 21, 23

1936. Poisson, R. Bull. de la Soc. Sci. de Bretagne, XIII, p. 60.

1940. Walton, G. A. *in* Hutchinson's Revision of the Corixidae of India . . Trans. Connecticut Academy of Arts and Sciences, XXXIII, p. 345 (*Callicorixa* as subg of *Corixa*).

1943. China, W. E. The Generic Names of British Insects, Pt. 8. The Generic Names of British Hemiptera-Heteroptera . . . , p. 306 (*Callicorixa* as subg. of *Corixa*)

Medium sized Corixidae. Head short and broadly rounded as seen from above. Interocular space broad. Postocular space narrow. Pronotal disk rather long, its lateral margins long and often nearly parallel. Lateral lobe of prothorax flat, longer than broad, its anterior distal angle slightly produced. Pronotum and hemelytra crossbanded but the two colors usually not as contrasting as in many Corixidae. Surface of pronotum, clavus and corium heavily rastrate. Metaxyphus well developed. The hind tarsus nearly always infuscated. The male pala with two rows of pegs. Male asymmetry dextral, no strigil. Median lobe of seventh abdominal tergite with a fringe of long hairs.

Genotype: *C. praeusta* Fieber.

Kirkaldy raised *Callicorixa* B. White to generic rank in 1906 or earlier. Then in 1924 Jaczewski decided that it was congeneric with *Arctocorixa* Wallengren and used *Callicorixa* to include most of the European species having dextral males. This proposal I have never been able to accept. Doctor Lundblad also considers *Callicorixa* a good genus as have several others since 1924. While I have included *C. concinna* (Fieb.) and *C. gebleri* (Fieb.) in this genus for historical reasons and because they can be run there in my key, they do not have the uniform general facies nor the typical male pala of the others. I have wished to call attention to their structural details and point out that they are not as closely akin as are the other species. The absence of a strigil, linked with a characteristic male pala, a general facies that places females as well as males and their boreal distribution indicates a well fixed combination of characters by which we can recognize the other species as a close phylogenetic group worthy of generic rank. The loss of a strigil has occurred in *Centrocorisa,* which is not related to *Callicorixa;* in a few species that probably belong to the *Tropocorixa* group of *Sigara* (*Callicorixa chinensis* Lundb. and *Sigara jensen-haarupi* Jacz.); in *Corisa bellula* Horv. and *C. parvula* Mats. that may belong with my *"signata* group"; in *Callicorixa japonica* Lundb. which is a synonym of *C. nigroventralis* Mats.; in *Sigara armata* Lundb. and *Callicorixa wui* Lundb. of which I have no examples; and in *Callicorixa acromelaena* Horv. and *Callicorixa kiritshenko* Lundb. which have the broad mesoepimeron like *Callicorixa concinna* and could be grouped with it in a new subgenus of *Sigara.*

KEY TO *CALLICORIXA* B. WHITE

(Including *C. concinna* Fieber)

1. Mesoepimeron broad with osteole remote from tip; both tarsal segments of hind leg infuscated.................................*C. concinna* (Fieb.) (p. 459)

Mesoepimeron narrow with osteole near tip, last tarsal segment of hind leg never infuscated 2

2. (1) First tarsal segment of hind leg concolorous throughout.................... 3

First tarsal segment of hind leg infuscated for at least a part of its length..... 4

3. (2) Lateral lobe of prothorax in female only half as wide at base as long. In male with anterior distal angle of lobe acute (Tibet) ....*C. gebleri* (Fieb.) (p. 462)

Lateral lobe of prothorax in female nearly as wide at base as long. In male with anterior distal angle of lobe not acute. (N. American). *C. audeni* Hungfd. (p. 464)

4. (2) Males 5

Females 12

5. (4) Males with a dense hair patch on the front femur....................... 6

Males with only a pilose area on the front femur.......................... 10

6. (5) Distal portion of right clasper of male genital capsule forming almost a right angle; first tarsal segment of hind leg heavily infuscated on distal third.... 7

Distal portion of right clasper of male genital capsule curved; first tarsal segment of hind leg infuscated only on distal margin......................... 8

7. (6) Basal row of pegs single toward apex, multiple at base of pala, *C. tetoni* n. sp. (p. 469)

Basal row of pegs single throughout.................*C. alaskensis* Hungfd. (p. 470)

8. (6) Pala thicker at middle than at base as seen in dorsal view. *C. producta sackalinensis* (Mats.) (p. 473)

Pala thinner at middle than at base as seen in dorsal view 9

9. (8) Inner margin of dorsal surface of male pala evenly curved throughout. *C producta producta* (Reuter) (p. 475)

Inner margin of dorsal surface of male pala abruptly curved inward just before apical third ....*C. producta noorvikensis* Hungfd. (p. 477)

10. (5) Dorsal surface of pala much depressed (European). ....*C. praeusta* (Fieb.) (p. 479)

Dorsal surface of pala not unusually depressed.. 11

11. (10) Dorsal surface of tibia and pala of foreleg heavily infuscated, tip of right clasper of male genital capsule with a fold or flap. (N. American.) *C. vulnerata* (Uhl.) (p. 481)

Dorsal surface of tibia and pala of foreleg not infuscated; tip of right clasper of male genital capsule without a fold or flap. (European.) *C. wollastoni* (D. & S.) (p. 484)

12. (4) Apical third of first tarsal segment of hind leg typically infuscated 13

Apical fourth of first tarsal segment of hind leg typically infuscated 15

13. (12) European species....... ....*C. praeusta* (Fieb.) (p. 479)

North American species 14

14. (13) Patterned portion of basal angle of corium extending more than half way along the pruinose area of the claval suture...... .... .. *C. alaskensis* Hungfd. (p. 470)

Patterned portion of basal angle of corium extending half way or less than half way along the pruinose area of the claval suture. .... ..*C tetoni* n. sp. (p. 469)

15. (12) Claw shorter than tarsus of middle leg.... 16

Claw equal in length to tarsus of middle leg...... 17

16. (15) Black area of first tarsal segment of hind leg confined to narrow line on inner margin (N. American).. ... .*C. producta noorvikensis* Hungfd (p. 477)

N. E Asia, *C. producta sackalinensis* (Mats) (p. 473)

Black area of hind leg covering almost the entire tip of first tarsal segment (Europe) ....*C. producta producta* (Reuter) (p. 475)

17. (15) Patterned portion of basal angle of corium extending about half way along pruinose area of claval suture (European)...........*C wollastoni* (D. & S.) (p. 484)

Patterned portion of basal angle of corium extending about two-thirds of way along pruinose area of claval suture (N. American)......*C. vulnerata* (Uhl.) (p. 481)

*Callicorixa** *concinna* (Fieber)

(Plate LXXVII, figs. 1, 1a to 1d)

1848. *Corisa concinna* Fieber, F. X. Synopsis aller bisher in Europa entdeckten Arten der Gattung Corisa *in* Bull. Soc. Nat. Moskva XXI, p. 522. (For other references up to 1927 see Lundblad, 1927.)

1927. *Callicorixa concinna*, Lundblad, O. Entomologisk Tidskrift XLVIII, Haft 2, pp. 89-91, Pl. II, figs. 11-16; Pl. III, figs. 17-20; Pl. VII, fig. 55.

1930. *Sigara* (*Callicorixa*) *concinna*, Jones, H. P. Entomologist's Record, XL-XLII; reprint, pp. 76-77.

1931. *Sigara concinna*, Horvath, G. Arbeiten der I Abt. des Ungerischen Biologischen Forschungs institutes, Band IV, p. 2.

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* *Concinna* is not a true *Callicorixa*.

1933. *Callicorixa concinna*, Hoffmann, W. E. Lingnan Sci. Jl. XII, Suppl., p. 257 (Canton, China).

1934. *Sigara concinna*, Jaczewski, T. Annales Musei Zool. Polonici X, Nr. 14, pl. 278.

1935. *Sigara* (*Callicorixa*) *concinna*, Stichel, W. Illustrierte Bestimmungs Tabellen der Deutschen Wanzen. Lieferung 11, p. 317, Lief. 12, p. 331.

1935. *Callicorixa concinna*, Hedicke, H. Tierwelt Mitteleur, Leipzig 4, 1 Tiel 3, Lief. X, p. 23.

1935. *Sigara* (*Callicorixa*) *concinna*, Poisson, R. Archives de Zool. Exp. et Gén., LXXVII, pp. 552-553, fig. 74.

1936. *Callicorixa concinna*, Lundblad, O. Entomologisk Tidskrift LVII, Häfte 1, p. 60 (ecological notes).

1936. *Callicorixa concinna*, Walton, G. A. Ent. Mo. Mag., S. 3, LXXII, p. 20 (in Somerset, Eng.).

1936. *Sigara* (*Callicorixa*) *concinna*, Poisson, R. Bull. de la Soc. Scientifique de Bretagne XIII, Fasc. 1 and 2, p 12.

1937. *Callicorixa concinna*, Wagner, Eduard. Verhandl. des Ver. f. naturw. Heimatforschung zu Hamburg, Bd. 25, p 63.

1938. *Sigara* (*Callicorixa*) *concinna*, China, W. E. Ent. Mo. Mag., LXXIV, p. 38.

1938. *Sigara concinna*, Michalk, Otto. Sitzungsberichte der Naturforschenden Gesellschaft zu Leipzig 63-64, Jahrgang 1938, p. 164.

1939. *Callicorixa concinna*, Pearce, E. J., and Walton, G. A. Trans. Soc. Brit. Ent., VI, Pt. 7, p. 158.

1939. *Sigara* (*Callicorixa*) *concinna*, Wroblewski, A. Fragmenta Faunistica Musei Zool. Polonici IV, p. 118.

1939. *Sigara concinna*, Macan, T T. Freshwater Biol. Assoc of Brit. Emp. Sci. Pub No. 1, pp. 16 and 25, figs. 19c, 20a, 21c and 22q.

1941. *Callicorixa concinna*, Hoffmann, W. E. Lingnan Sci. Jl. XX, No 1, p. 12.

1943. *Corixa concinna*, Brown, E. S. Trans. Soc. Brit. Ent., VIII, Pt. 6, pp. 174, 225

1943. *Corixa* (*Callicorixa*) *concinna*, China, W. E. The Generic Names of British Hemiptera-Heteroptera . . . *in* The Generic Names of British Insects, Pt. 8, pub. by Royal Ent. Soc. London, pp. 283, 306.

1946? *Corixa concinna*, Brown, E. S. Trans. Dumfriesshire and Galloway Nat. Hist and Anti. Soc., XXIII, p. 7.

Size: Length 6.1 mm. to 7.2 mm. Head width 1.9 mm. to 2.1 mm. General shape slender.

Color: General facies medium brown. Pronotum crossed by about 8-9 narrow brown bands. Some of bands on clavus forked at tips, but generally in regular series. Those of corium and membrane wavy and irregular. Corium and membrane separated by pale line. Embolium yellowish white. Head and limbs yellow. Hind leg with dark spot at distal end of first tarsal segment and on basal half of second tarsal segment. Abdominal venter dark at base, yellow distally.

Structural characteristics: Head about two-thirds as long as pronotal disk, rounded across vertex; facial hairs few; male fovea broad, fairly shallow; synthlipsis wider than width of an eye. Antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 18 : 40 : 20 males; 1 : 2 : 3 : 4 :: 20 : 18 : 42 : 22 females. Pronotal disk about one-third wider than long, pointed apically; a faint median carina on basal fourth. Pronotum and hemelytra faintly rastrate, the latter with a few long, pale hairs, more noticeable on membrane.

Lateral lobe of prothorax about half as wide as long, rounded apically. Mesoepimeron broad with osteole about half way between tip and lateral emargination. Metaxyphus a little longer than broad, tip rounded.

Foreleg of male: Pala with sides parallel, apex bluntly rounded. Pegs not divided into two rows, numbering about 36. Upper palmar row of bristles interrupted with about 4 stouter bristles inserted near claw. Tibia slender, about two-thirds as long as pala, with pronounced carina reaching almost to base; carina terminating apically in a pad. Femur moderately slender with small hair patch on inner surface near base. No row of stiff bristles as in true *Callicorixa.*

Foreleg of female: Pala long, slender, tapering to point; tibia about half as long as pala, slender, terminating in row of stiff spines; femur moderately slender with row of stiff hairs on inner surface near base. Middle and hind legs slender, the former with the claw longer than tarsus, the latter with black spot on apical fourth of first tarsus and on basal half of last tarsus. Hind femur with a row of pegs on inner dorsal margin. The proportion of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 45.6 : 33.4 : 36.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 90 : 112.5 : 52.5. Male asymmetry dextral, without a strigil. For details of male structures see Plate LXXVII.

Comparative notes: This species differs from true *Callicorixa* in having the mesoepimeron broad with osteole remote from the tip, in having the claw of the middle leg slightly longer than its tarsus, and in having a row of pegs on the inner dorsal margin of the hind femur. The row of pegs in the male pala is unbroken and other differences pointed out by Lundblad in 1927 make the position of this species doubtful.

Location of types: Unknown to me.

Data on distribution: (Plate LXXVIII.) This species is not found in America. Oshanin, 1912, in his Katalog der Paläarktischen Hemipteren, gives Europe, Caucasus, Turkestan, Siberia, and N. Mongolia.

We have in the Francis Huntington Snow Collections the following: *England,* Herefordshire, August, 1936, G. A. Walton, 2 males, 1 female; *Poland,* August 12, 1922, T. Jaczewski, 1 male, 2 females; *Transcasp.,* Ahnger, 1 male; *Moldavie,* Valldu Berlad, A. L. Montandon, 5 males, 1 female; *Caucasus,* regio Kubanensis, Tamen, 30, IV, 1907, A. Kiritshenko, 3 females; *Hungaria,* Kecskemét, 4 males, 2 females; *China,* Djalantun Gr. Khingan, June, 1938, M. Weymarn, 5 males, 3 females; from N. Manchuria: Djalantun Gr. Khingan, May 15-20, 1939, M. Weymarn, 1 male; Ashliko R. Valley, September, 1938, A. S. Loukashkin, 3 males; Ashliko R. Valley, September, 1938, M. Nitikin, 1 male, 1 female; Harbin, Sungari R. Valley, September 27, 1938, B. Skvortzov, 1 male, 2 females; from Manchuria: Shitzonhotze St., August 1-15, 1939, A. S. Loukashkin, 1 male; Harbin, marshy lake in Sungari R. Valley, August 1, 1938, M. Nitikin, 8 males, 5 females; marshy pool in valley of Ashliko R. near Harbin, under thin ice, November 1-2, 1938, M. Nitikin, 1 female.

Callicorixa gebleri (Fieber)

(Plate LXXVII, figs. 2, 2a to 2d)

1848. *Corisa gebleri* Fieber, F. X. Bull. Soc. Nat. Mosc. XX, Pt. 2, pp 522-523. (For other references before 1927 see Lundblad below.)

1927. *Callicorixa gebleri,* Lundblad, O. Ento. Tidskrift XLVIII, Häft 2, pp. 77-80, pl I and pl. II, figs. 8, 9, 10, pl. VII, fig. 46.

1933. *Sigara gebleri,* Jaczewski, T. Ann. and Mag Nat Hist, Ser. 10, XII, p 588

1933. *Callicorixa gebleri,* Hoffmann, W. E. Lingnan Science Jl. XII, Suppl. p. 257.

1935. *Sigara (Callicorixa) gebleri,* Poisson, R. Archiv. de Zool. Exp. et Gén LXXVII, pp. 553-554, fig. 75.

1935. *Sigara (Callicorixa) gebleri,* Stichel, W. Illustrierte Bestimmungs, Tabellen der Deutschen Wanzen, Lief. 11, p. 319, figs. 774-777; also Lief. 12, p. 332.

1936. *Sigara (Callicorixa) gebleri,* Poisson, R Bill. de la Soc Sci. de Bretagne XIII, fasc. 1 and 2, p. 11.

1939. *Sigara (Callicorixa) gebleri,* Jaczewski, T Annales Musei Zollogici Polonici XIII, No. 28, p. 287.

1940. *Corixa (Callicorixa) gebleri,* Hutchinson, G. E Trans. Conn. Acad. Arts and Sci. XXXIII, p. 460.

1941. *Callicorixa gebleri,* Hoffmann, W. E. Lingnan Sci. Jl. XX, No. 1, p. 18.

Size: Length 6.8 mm. to 7.2 mm. Width of head 1.97 mm. to 2.1 mm. General shape slender.

Color: General facies medium brown. Pronotum crossed by about 10 incomplete, irregular, narrow bands. Clavus with narrow, transverse bands. Corial pattern of irregular, narrow bands. Pattern at base of membrane etched away; membrane and corium separated by pale line. Embolium yellowish white. Head and limbs yellow; dorsal surface of male pala edged with black; hind tarsi concolorous throughout. Venter black.

Structural characteristics: Head about one-third length of pronotal disk, vertex produced in males; synthlipsis a little wider than width of an eye; facial hairs few; male fovea broad, concave, not quite attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 15 : 40 : 28 males; 1 : 2 : 3 : 4 :: 23 : 15 : 40 : 28 females. Pronotum and hemelytra strongly rastrate. Median carina visible on anterior third of pronotum. Corium and membrane with a few pale hairs.

Lateral lobe of prothorax long, sides parallel; anterior distal angle acute in male; in female only half as wide at base as it is long. Mesoepimeron narrow; osteole near tip. Metaxyphus about as broad as long; tip pointed, extending about half way along hind coxae. Front leg: Male pala long and slender, sides parallel, end bluntly rounded. Pegs in two rows, the basal row consisting of about 22 teeth, the distal, curved row of about 12 teeth. Upper palmar row of bristles interrupted distally, with group of about 4 pegs inserted between claw and bristles. Male tibia with slight, short dorsal carina. Small pad on upper portion of distal margin; fringe of about 6 hairs on lower portion. Male femur slender; hairy at base and on inner surface. Row of short bristles from distal portion of hair patch to apical margin. Female pala long and slender. Tibia with fringe of hairs along apical margin. Femur hairy at base as in male but lacking row of bristles. Middle and hind legs slender. Relative proportion of segment to segment: Middle leg: Femur : tibia : tarsus : claw :: 100 : 52.2 : 33.4 : 33.4; hind leg: Femur : tibia : tarsus 1 ; tarsus 2 :: 100 : 99.7 : 113.1 : 52.6. Without spines on hind femur. Keel of genital capsule or tip of ninth segment complex. For details of structures see Plate LXXVII, figs. 2, 2a-2d.

Comparative notes: This species has the general facies characteristic of the *Callicorixa* including the infuscations of pala and hind tarsus, but the male pala is more slender and the genital capsule is uniquely modified. See Plate LXXVII, figs. 2c and 2d.

Location of types: Unknown to me. Described from a female sent to Fieber by Kolenati that was taken at Barnaul, Siberia, by Gebler.

Data on distribution: (Plate LXXVIII.) Oshanin, 1912, lists: Caucasus, Siberia, Mongolia, N. Turkestan and Nearctic region. Lundblad studied material sent him by Doctor Kiritshenko from "See Syrdach, Amginskaja sloboda, Prov. Jakutsk, and Krasnojarsk, Prov. Jenissejsk," also from East Asia. Jaczewski, 1933, reported the following interesting captures from the Himalayas: Sikhim, Gnatang, 12,000 ft., 31-III-1924, in mountain pool, 2 females; Tibet, Yatung, 11,000 ft., 4-IV-1924, 7 males, 7 females; Tibet, Tsango Chumbab, 14,000 ft., 5-V-1924, 2 males, 3 females; Tibet, Pangle, 15,000 ft., 8-V-1924, 1 female, and states that the species reaches in the west as far as the extreme southeast of Europe (Lower Volga) and eastern Caucasus. I think the Alaska record must be an error. We have studied the material taken by Major Hingston in Tibet and reported by Doctor Jaczewski and have a pair of specimens sent me by Doctor Kiritshenko labeled "Yalutorovsk, Tobolsk, Gub. 8 Lagen V-11." We have seen nothing from North America like this species.

Callicorixa audeni Hungerford

(Plate LXXVI, figs. 2, 2a to 2h)

1928. *Callicorixa audeni* Hungerford, H. B. Can. Ent., XL, p. 229, Pl. 18, figs. 6 and 12.

1930. *Callicorixa canadensis* Walley, G. S. Can. Ent., LXII, p. 80, Pl. 10, figs. 5, 6, 7, 8 and 9.

Size: Length 7.1 mm. to 8.1 mm. Head width 2.2 mm. to 2.5 mm. Shape moderately broad.

Color: General facies medium to dark. Pronotum crossed by 9-10 brown bands. Clavus with regularly spaced brown bands in transverse rows. Pattern of corium more irregular but in transverse series. Membrane separated from corium by pale yellowish line. Pattern of membrane indistinct; brownish yellow. Head, venter, and limbs yellow. Hind tarsi concolorous throughout. Embolium yellowish-white.

Structural characteristics: Head about one-third length of pronotal disk; vertex rounded; synthlipsis slightly wider than width of eye; facial hairs few; male fovea broad, concave, not quite attaining eyes laterally. Antennal segmentation: 1 : 2 : 3 : 4 :: 28 : 18 : 47 : 30 ♂ ; 1 : 2 : 3 : 4 :: 28 : 20 : 42 : 30 ♀ . Pronotum and hemelytra strongly rastrate. Median carina visible on anterior third of pronotum. Clavus and corium without hairs. Membrane smooth, shining, with a few long, pale hairs.

Lateral lobe of prothorax long, sides parallel, anterior distal angle in male not acute. Mesoepimeron narrow; osteole near the tip. Metaxyphus about as broad as long, tip pointed; extending about half way along hind coxae.

Front leg: Male pala cultrate, distal end rounded. Pegs usually in two distinct rows, one lying along distal margin and one extending from base about midway of pala. Basal row consisting of 14-15 pegs; distal row consisting of 11-12 pegs. Upper palmar row of bristles interrupted apically and group of 2 or 3 pegs inserted close to claw.

Male tibia: with pronounced dorsal carina extending almost to base of tibia. Pad on upper portion of distal margin; fringe of 6-8 hairs on lower portion of distal margin. Male femur slender. With patch of hairs on inner basal portion and with row of short bristles extending from distal portion of hair patch to apical margin. Female pala long and slender. Tibia with fringe of hairs along apical margin. Femur hairy at base as in male but lacking row of bristles. Middle and hind legs slender in both sexes. Relative proportion of segment to segment as follows (without row of pegs on dorsum of hind femora): Middle leg: femur : tibia : tarsus : claw :: 100 : 44.9 : 33 : 33. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.8 : 111 : 51.1. For details of male abdomen and genitalia see Plate LXXVI, Figs. 2i, 2e, 2f, 2g, 2h.

Comparative notes: This is the only American species of this group lacking a dark spot on the hind tarsus. While it runs to the same couplet with *C. gebleri* (Fieb.) in our key, a comparison of the drawings on Plates LXXVI and LXXVII will show that they are not closely related.

Location of types: Described from two specimens, male and female, taken by K. F. Auden in Adams Lake, B. C., July 20, 1925. Holotype and allotype in Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate LXXVIII.) We have before us, besides the types, the following:

ALASKA: Aleutian Islands, June, 1944, Bernard McDermott, 3 males, 4 females.

CANADA: *Yukon*, White Horse, May 7, 1912, Jessup, 1 male, 7 females.

Northwest Territories: Great Slave Lake, Outpost Isl., August 22, 1945, D. S. Rawson, 1 female; same place and collector, September 1, 1945, 1 female.

British Columbia: Nulki Lake, Nr. Vanderhoof, June 8, 1945, J. A. Munro, 1 male; same place, July 21, 1945, 2 males, 2 females; same place, July 31, 1945, 2 males, 1 female; same place, June 10, 1945, 1 female; September 11, 1945, H. B. Leech (Field Mus. Coll.), 14 males, 16 females; Downie Creek, Selkirk Mts., August 14, 1905, J. C. Bradley (Cornell), 2 males, 4 females; Prairie Hills, July, 1919, Bradley (Cornell), 2 males, 3 females.

Alberta: Lost Lake, 6 males, 39 females; Edmonton, May 6, 1924, Owen Bryant, 9 males, 17 females; Lethbridge, September 2, 1921, 1 male; Laggan, Upper Ptarmigan Lake, July 22, 1928, O. Bryant, 1 male, 1 female; High River, June 25, 1927, O. Bryant, 1 male; Bilby, July 12, 1924, O. Bryant, 1 female; Banff, August 5, 1925, O. Bryant, 1 male; High River, June 25, 1927, O. Bryant, 1 male.

Saskatchewan: Murray Lake, 1940, 1 male, 2 females; Au 'appelle River, 1940, 1 male; Turtle Lake, 1940, 1 female; Redberry Lake, 1940, 1 male, all collected by D. S. Rawson; Pelly, August 2, 1937, C. L. Johnston, 2 males, 1 female; same date and place, R. H. Beamer, 5 males, 9 females.

Manitoba: Deepdale, August 1, 1937, C. L. Johnston, 11 males, 13 females; Oakner, July 31, 1937, C. L. Johnston, 2 males, 7 females; Winnipeg, June 15, 1913, S. L. Thompson, 1 female; Cowan, August 7, 1937, C. L. Johnston, 1 male; Swan River, August 2, 1937, C. L. Johnston, 7 males, 1 female; Clear Lake, August 8, 1937, C. L. Johnston, 3 males, 1 female; MacDonald, August 9, 1937, H. T. Peters, 1 male; Red Deer River, August 3, 1937, C. L. Johnston, 1 male; Treesbank, July 25, 1910, J. B. Wallis (Wallis Coll.), 1 male, 2 females; April 15, 1909, 2 males, 6 females; April 10, 1910, same place and collector; Winnipeg, June 15, 1913, S. L. Thompson (Chicago Field Mus.), 1 male; Mafeking, August 3, 1937, C. L. Johnston, 2 males, 2 females; Hartney, July 31, 1937, R. H. Beamer, 4 males.

Ontario: Toronto, March 21, 1931, E. C. Bradley (Lutz); Thunder Bay Beach, July 9, 1941, H. S. Parish (Lutz); Thunder River, June 13, 1930, W. J. Brown (record sent by Walley).

Quebec: Natashquan, July 25, 1930, W. J. Brown, 1 female; Duparquet, July 22, 1943, G. Stace Smith, via Hugh Leech, 5 males, 9 females; Natashquan, August 3, 1929, W. J. Brown; Mascanin, June 20, 1929, W. J. Brown; Kazubazua, August 28, 1929, W. J. Brown, (the last three records sent by Walley).

New Brunswick: St. Andrews, Summer, 1930, M. W. Smith (record sent by Walley).

Newfoundland: Ferryland, August 2, 1934, S. T. Brooks (Carnegie), 1 male; Lewisport, July-August, 1905, L. P. Gratacap (A. M. N. H.), 16 males, 15 females; Codroy, same date and collector (A. M. N. H.), 1 female.

UNITED STATES: *Washington:* Republic, August 7, 1931, L. D. Anderson, 2 females; Mason County, L. Cushman, June 12, 1919, H. M. Gaige (Mich. Coll.), 1 male, 4 females; Springdale, September 10, 1920, F. N. Blanchard (Mich. Coll.), 3 males, 2 females; Mason Co., L. Cushman, September 5, 1919, P. Putman, 12 males, 11 females.

Oregon: South of Worden, July 1, 1935, Paul Oman (U. S. N. M.), 1 male; Crater Lake Park, August 15, 1930, H. A. Scullen; Lake Co., Warner Lake, July 30, 1934, C. L. Hubbs (Mich. Coll), 1 male, 1 female.

California: Lake Tahoe, August 11, 1940, L. C. Kuitert, 8 males, 5 females; Tuolemne Meadows, August 1, 1940, L. C. Kuitert, 4 females; California (Uhler Coll.), 2 males, 2 females; Eagle L., Lassen Co., July 7, 1931, (Calif. Acad. Sci.).

Nevada: Cherry Creek, 1930, Hot Spring Expedition, 1 female.

Idaho: Burley, July 6, 1931, L. D. Anderson, 1 male; Beaver Can., July 23, (O. Heidemann Coll., Cornell Univ.) (det. by Uhler *Corixa* new?), 2 females; Custer Co., Lost R. Valley, July, 1934, C. L. Hubbs (Mich. Coll.), 4 males, 6 females.

Montana: Whitehall, Aug. 13, 1931, L. D. Anderson, 9 males, 8 females; Bozeman, same date and collector, 2 males, 8 females; Bennett, Aug. 12, 1931, same collector, 6 males, 6 females; Drummond, Aug. 11, 1931, L. D. Anderson, 5 males, 5 females; Glacier Park, Aug. 20, 1926, G. Cady, 1 male, 1 female; Jefferson, July 9, 1941, 1 male, 2 females; Shoal Lake, July 31, 1937, R. H. Beamer, 4 males, 5 females; Gallatin Co., May 6, 1927; Anaconda, Aug. 12, 1931, L. D. Anderson; Madison River, S. Cady; Broadwater Co., L. Sewall, Aug. 23, 1941, G. K. MacMillan (Carnegie), 1 female.

Utah: Orton, Aug. 12, 1936, J. D. Beamer, 1 female; Antelope, July 1, 1931, L. D. Anderson, 2 females; Amalga, June 30, 1937, G. F. Knowlton (Utah Coll.), 1 female; Logan, Aug. 14, 1932, B. G. Whitaker (Utah Coll.), 2 males; Logan, July 11, 1933, T. O. Thatcher (Utah Coll.), 1 male; Logan, Aug. 13, 1934, F. H. Gunnell (Utah Coll.), 11 males, 8 females; Brigham, Aug. 16, 1934, F. H. Gunnell (Utah Coll.), 1 female; Hyde Park, April 19, 1930, G. F. Knowlton, 1 female; Farr West, C. J. D. Brown, 1 female; Logan Meadows, Logan, March 21, 1929, Knowlton, 4 males, 5 females; Orem, July 21, 1936, G. F. Knowlton, 3 males, 3 females; Spanish Fork, June 27, 1936, G. F. Knowlton, 2 males, 2 females; same place, at light, June 19, 1938, Knowlton and Anderson, 4 males, 6 females; Pleasant Grove, July 7, 1937, G. F. Knowlton, 1 female; Alton, Aug. 11, 1936, M. B. Jackson, 2 males, 3 females; Fish Lake, Aug. 16, 1929, L. D. Anderson; Lehi, April 4, 1930, Knowlton; Benson Wd., April 8, 1930, Knowlton; Provo Canyon, Aug. 15, 1940, L. C. Kuitert; Beber, Aug. 17, 1940, L. C. Kuitert, 2 females; Delta (at light), July 5, 1938, Stains and Knowlton (Utah Coll.), 1 female; Logan, July 7, 1932, J. H. Linford (Utah Coll.), 7 males, 5 females; American Forks (at light), Aug. 9, 1934, H. F. Thornley (Utah Coll.), 1 female; Pleasant Grove, June 23, 1937, G. F. Knowlton (Utah Coll.), 1 female; Lehi, July 3, 1936, H. F. Thornley (Utah Coll.), 1 female.

Wyoming: Yellowstone Park, Aug. 22, 1915, 5 males, 9 females; Grand Teton Nat'l Park, Aug. 18, 1931, L. D. Anderson; Boulder, Aug. 19, 1931, L. D. Anderson; National Park, July 26, 1891 (O. Heidemann Coll., Cornell Univ.) (det. by Uhler *Corixa* new?), 1 male, 2 females; Yellowstone Park, 9 males, 12 females.

Colorado: Gould, Aug. 20, 1940, H. C. Severin, 27 males, 32 females; Walden, Aug. 25, 1941, H. C. Severin, 2 males, 4 females; Kremmling, 10 mi. north, Aug. 21, 1941, H. C. Severin, 4 males, 2 females; Hillside, 6 mi. S., Aug. 25, 1941, H. C. Severin, 5 males, 2 females; Pingree Park, Aug. 30, 1924, Beamer and Lawson, 108 males, 128 females; Peyton, Aug. 19, 1936, J. D. Beamer, 1 male; Craig, Aug. 18, 1940, L. C. Kuitert, 3 males, 4 females; Walden, Aug. 20, 1931, L. D. Anderson, 3 males, 6 females; Northgate, Aug. 30, 1931, L. D. Anderson, 2 males, 1 female; Creede, 8,844 feet, Aug., 1914, S. J. Hunter, 5 males, 1 female; Alamosa, July 6, 1937, C. L. Johnston, 15 males, 12 females; Rabbit Ear Pass, 10 mi. north, Aug. 21, 1941, H. C. Severin, 1 male, 2 females; Steamboat Springs, Aug. 21, 1941, H. C. Severin, 4 males, 2 females; Leadville, 10 mi. south, Aug. 23, 1941, H. C. Severin, 1 male, 2 females; Maybell, Aug. 18, 1940, L. C. Kuitert, 10 males, 16 females; Cameron's Pass, Aug. 20, 1940, L. C. Kuitert, 4 males, 5 females; Colorado (Uhler Coll.), 2 males, 1 female.

North Dakota: Linton, July 23, 1937, H. T. Peters, 1 male; L. Mitagoshi, July 30, 1937, H. T. Peters, 2 females; Weta, July 18, 1937, C. L. Johnston, 1 male; Tokio, July 28, 1937, R. H. Beamer, 1 male; Nelson County, Stump Lake, Aug. 25, 1922, T. L. Hankinson (Mich. Coll.), 1 male, 5 females; Ramsey County, Lake Irvin, Aug. 21, 1922, T. L. Hankinson (Mich. Coll.), 35 males, 41 females; Hillsboro, July 24, 1936, H. R. Beamer, 1 male; Devil's L., July 20, 1920, T. H. Hubbell (Mich.), 4 males.

Minnesota; Becker County, Aug. 22, 1922, H. B. Hungerford, 2 females; Cooley, Aug. 13, 1937, C. L. Johnston, 3 males; Pelican Rapids, Aug. 22, 1922, H. B. Hungerford, 1 male; Itasca Park, Green Lake, Aug. 21, 1923, H. B. Hungerford; Becker County, Shell Lake, Aug. 22, 1922, H. B. Hungerford.

Michigan: Douglas Lake, Smith's Bog, June 11, 1923, H. B. Hungerford, 5 males, 7 females; Douglas Lake, July 20, 1926, H. B. Hungerford, 2 males, 6 females; same place and collector, July 31, 1923, 2 females; Mackinaw Isl., Cheb. Co., Aug. 4, 1929, H. B. Hungerford, 2 females; Cheboygan County, July 9, 1932, H. B. Hungerford, 1 female; Bois Blanc Island, Aug. 14, 1932, H. B. Hungerford, 1 female; Charlevoix, Feb. 28, 1894, A. Wolcott (Nebr. Coll.), 1 male, 1 female; Dickinson County, July 22, 1909, W. W. Newcomb (Mich. Coll.). 3 males.

Maine: Lincoln, Sept. 3, 1934, H. G. Walker, 1 female.

Callicorixa tetoni n. sp.

(Plate LXXVI, figs. 1, 1a to 1e)

Size: Length 6.7 mm. to 7.1 mm. Width of head 2.1 mm. to 2.3 mm. General shape slender.

Color: General facies medium brown. Pronotum crossed by about 10 narrow dark bands, somewhat broken and irregular. Dark bands of clavus and corium narrower than pale ones, broken or irregular, often furcate. Dark areas of corium tending to be coalescent along inner apical angle. Membrane separated from corium by pale line and having confusedly mottled pattern. Embolium yellowish white. Head and abdominal venter pale yellow. Borders of thoracic venter pale, black around bases of coxae. Limbs pale, except first tarsal segment of hind leg which has black spot on apical fourth. No black on second tarsal segment.

Structural characteristics: Head about half as long as pronotal disk; facial hairs few; vertex rounded; synthlipsis wider than width of an eye; male fovea broad and fairly deep; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 42 : 30 ♂ ; 1 : 2 : 3 : 4 :: 22 : 18 : 45 : 32 ♀ . Pronotal carina faintly visible on anterior fourth. Pronotum finely rastrate; rounded behind. Hemelytra moderately rastrate, with a few long, pale hairs. In female, the patterned portion of the basal angle of the corium extending less than half way along pruinose area of claval fold. Lateral lobe of prothorax about half as broad as long, that of male with sides tapering slightly toward bluntly rounded apex, that of female with sides parallel throughout. Metaxyphus slightly longer than broad, sides tapering to sharp point. Mesoepimeron narrow with osteole near end. Foreleg of male: pala with dorsal surface somewhat depressed as seen in lateral view, rounded apically to claw. Pegs in two rows, the apical one with about 14 teeth, and overlapping apical end of basal row.

The latter with pegs single toward apex, but multiple at base of row, about 32 teeth in all. Upper palmar row of bristles interrupted apically and about 4 teeth inserted near claw. Tibia about two-thirds as long as pala. Dorsal carina extending almost from base and terminating apically in a small pad. A fringe of short spines along lower apical margin of tibia. Femur stout; patch of long hairs on inner basal surface, somewhat obscuring a patch of stridulatory teeth in same region; a few spines in a row extending from apical end of hair patch to end of femur; on dorsal surface, near distal edge, a pair of long, stout, spinelike hairs. Foreleg of female: pala elongate, tapering to point. Tibia about half as long as pala, lower apical margin bordered with fringe of spines. Femur slender with oblong hair patch on inner basal surface; a row of hairs extending from apical edge of patch to distal margin of femur; a pair of stout hairs on dorsal surface near distal margin. Middle and hind legs slender. The claw of the middle leg equal in length to its tarsus. Relation of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 53.2 : 35 : 35; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 97.6 : 114.7 : 48.8. Central lobe of seventh abdominal segment of male triangularly produced, the angle formed subacute. For details of male structures see Plate LXXVI, figs. 1, 1a, 1b, and 1c.

Comparative notes: This species is most closely related to *C. alaskensis* Hungerford, but can be distinguished from it in having the claw of the middle leg equal to its tarsus, whereas in *alaskensis* the claw is shorter. Males can be distinguished from those of all other *Callicorixa* in having the teeth of the lower row of pegs multiple at the base.

Location of types: In Francis Huntington Snow Collections, University of Kansas, Lawrence, Kansas.

Data on distribution: (Plate LXXVIII.) Holotype male, allotype female and 4 male and 10 female paratypes from Grand Teton Nat'l Park, August 18, 1931, L. D. Anderson, collector.

Callicorixa alaskensis Hungerford

(Plate LXXV, figs. 2, 2a-2g)

• 1926. *Callicorixa alaskensis* Hungerford, H. B. Annals Ent. Soc. Amer., XIX, p. 462, Pl. XXXIV, figs. 6 and 8.

1930. *Callicorixa alaskensis*, Walley, G. S. Can. Ent. LXII, p. 79. (Records from shore of Gulf of St. Lawrence.)

1943. *Callicorixa alaskensis*, McClure, H. E. Ecological Monographs XIII, p. 14. (Permanent pool; eggs in June, adults in August.)

Referring also to this species.

1837. *Corixa striata* var. B., Kirby, Wm., *in* Fauna Boreali Amer. Pt. 4, p. 284.

1848. *Corisa praeusta* Fieber, F. X. Bull. Soc. Nat. Moskva, XXI, Pt. 2, p. 521 (the Unalaska and Sitka records).

1876. *Corixa praeusta,* Uhler, P. R. Bull. U. S. Geol. Geog. Surv. 1, p. 340 (quoting Fieber).

1900. *Corisa praeusta,* Heidemann, O. Proc. Wash. Acad. II, p. 506. (Records Sitka and Kodiak, Alaska.)

Size: Length 6.9 mm. to 8.1 mm. Head width 2 mm. to 2.3 mm. General shape slender.

Color: General facies medium brown. Pronotum crossed by 9-10 narrow, irregular brown bands. Clavus with regular, transverse brown bands. Corial pattern of irregular transverse bands. Corium and membrane separated by pale line. Membrane with confused brown mottlings. Embolium smoky. Head, limbs and margins of venter yellow. Dorsum of pala and fore tibia suffused with reddish brown. First segment of hind tarsus with black spot covering distal third. Venter, except margins, blackish.

Structural characteristics: Head about half as long as pronotal disk; vertex rounded; synthlipsis slightly wider than width of an eye. Antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 18 : 42 : 30 ♂; 1 : 2 : 3 : 4 :: 25 : 18 : 43 : 32 ♀. Male fovea shallow; facial hairs few. Pronotum with median carina on anterior third. Pronotum and hemelytra rastrate; the latter covered with very fine, pale hairs. In female the patterned portion of outer basal angle of corium extending at least half way along pruinose area of claval suture. Lateral lobe of prothorax long and slender, rounded apically. Mesoepimeron moderately broad, osteole near tip. Metaxyphus about as wide as long, tip slender, pointed.

Foreleg: Male pala quadrate, the distal end bluntly rounded. Teeth in two rows, the upper distal row overlapping basal row. About 14 teeth in upper row, 24 in lower. Upper palmar row of bristles interrupted distally with 3-4 stouter bristles inserted near claw. Tibia long and slender with dorsal carina reaching almost to base, a pad apically. Also a few short, stiff hairs. Femur with patch of stridulatory teeth on inner basal surface; these somewhat obscured by dense patch of long hairs. Extending from end of hair patch to apex a row of about half a dozen stout spines.

Female pala long and slender, tapering to point. Tibia slender with fringe of hairs apically. Femur with a few stout pegs and a few fine hairs. Middle and hind legs slender, the relation of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 53.2 : 35 : 35; hind leg: femur : tibia : tarsus 1 :

tarsus 2 :: 100 : 84.4 : 104.3 : 44.4. Without row of pegs on dorsal surface of hind femora. Genitalia as in Plate LXXV.

Comparative notes: This species can be distinguished from others of this genus by the dense hair patch on forefemora of the males, the apical row of pegs overlapping basal row in same sex, the fact that basal peg row is single throughout and in the female by the apical third of the first tarsal segment of hind leg infuscated.

Location of types: Described from 27 specimens taken in Kobuk river, Noorvik, Alaska, Aug. 6, 1925, by P. Scott. These are in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (See Plate LXXVIII).

ALASKA: Noorvik, Kobuk River, Aug. 6, 1925, P. Scott (Eskimo), 18 males, 5 females; Kodiak, Sept. 10, 1919, Jas. S. Hine, 4 males, 16 females; Agattu Isl., Aug. 12, 1937, V. B. Scheffer, Biol. Surv., 2 females; Unalaska, Aug. 26, 1937, V. B. Scheffer, 1 male; East Unalga Isl., Aug. 28, 1937, V. B. Scheffer, 2 females; near Juneau, Sept. 1, 1941, J. P. Anderson, 3 males, 11 females; Savonoski, Naknek Lake, Aug. 19, Jas. S. Hine, 2 males, 4 females; Nome, Aug. 14, 1913 (Carnegie Mus. Coll.).

CANADA: *Yukon:* Near Whitehorse, May 7, 1912, Jessup, 12 males, 8 females.

British Columbia: Sept. 11, 1945, H. B. Leach (Field Mus. Coll.), 1 female.

Alberta: Lost Lake, 1 female.

Manitoba: Churchill, July 5, 1936, N. E. McClure, 3 males, 23 females.

Quebec: Thunder River, June 10, 1929, W. J. Brown; Watshishu, June 18, 1929, W. J. Brown; Musquaro, Brag Harbor, June 24, 1929, W. J. Brown; Harrington Harbor, June 30, 1929, W. J. Brown; Little Mecatine I., July 6, 1929, W. J. Brown; Bradore Bay, July 27, 1929, W. J. Brown; Natashquan, June 21, 1929, W. J. Brown; Mutton Bay, July 11, 1929, W. J. Brown. The above records from Quebec all from Walley.

Nova Scotia: Truro, Aug. 6, 1913, R. Matheson, 2 males, 3 females.

Newfoundland: via Walton, 1 male.

UNITED STATES: *Washington:* Olympia, T. Kincaid (Cornell), 1 female.

Utah: Uinta County, Aug. 18, 1937, G. E. Wallace (Carnegie), 2 males; same place, Aug. 15, 1937, G. K. MacMillan (Carnegie), 12 males, 8 females.

Montana: Glacier Park, Aug. 20, 1926, G. Cady, 1 female; Madison River, Aug. 26, 1926, G. Cady, 1 female.

Wyoming: Yellowstone Park, Aug. 24, 1915, 5 males, 4 females; Two-gwo-tee Pass, Aug. 28, 1926, G. Cady, 1 male, 3 females.

Michigan: Douglas Lake, July 20, 1926, H. B. Hungerford, 3 females.

Pennsylvania: Spring Branch, May 22, 1945 (DDT expt.), R. I. Sailer (U. S. N. M.), 1 male, 1 female; Erie, Horseshoe Pond, Presque Isle, July, 1940, Mrs. T. Lewis (Carnegie), 1 male.

New York: Cranberry Lake, Aug. 10, 1920, C. J. Drake, 6 males, 3 females; same place and collector, Aug. 10, 1920, 1 male, 23 females (Drake Coll.).

New Hampshire: Mt. Wn., 1 female; New Hampshire, Aug. 17, 1926, J. O. Sherman, Jr. (U. S. N. M.), 1 male.

Callicorixa producta sackalinensis (Matsumura)

(Plate LXXIV, figs. 3, 3a to 3e)

1915 *Corixa sackalinensis* Matsumura, S., The Entomological Magazine (Japanese) I, Pt. 3, pp. 112-113, Pl. III, fig. 6.

Size: Length 6.4 mm. to 7.1 mm. Width of head 1.9 mm. to 2.2 mm. General shape rather slender.

Color: General facies medium brown. Pronotum crossed by 11 to 12 narrow dark bands, about half the width of pale areas. Clavus with regular brown bands in transverse series, those at base narrower than pale areas, those at middle and beyond broader than pale areas and tending to coalesce along mesal margin. Pattern of corium more irregular, the pale areas wavy and incomplete, the brown lines tending to coalesce at inner apical angle. Pale line separating corium from membrane. Membrane with irregular brown blotches in confused pattern. Embolium yellowish; head, limbs, and venter yellow. Hind leg with black area on apical fourth of first tarsal segment and confined to inner margin. No black on second tarsal segment.

Structural characteristics: Head about half as long as pronotal disk; vertex of male slightly produced, facial hairs few; male fovea broad, fairly deep; synthlipsis wider than width of an eye; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 12 : 30 : 20 ♂ ; 1 : 2 : 3 : 4 :: 20 : 16 : 30 : 20 ♀ . Pronotum with median carina visible on anterior fourth. Pronotum and hemelytra moderately rastrate, the latter with a few pale hairs on corium and membrane. Lateral lobe of prothorax about half as wide as long; in female with sides parallel; in male broader at base than at tip; end rounded in both sexes. Mesoepimeron narrow with osteole near tip. Metaxyphus about as broad at base as long; tip rounded. Foreleg of male: pala with sides almost parallel. Apex bluntly rounded from dorsal margin to claw. In dorsal view pala broader at middle than at base. Teeth in two rows, the apical row not overlapping basal one. About 12 teeth in apical row and about 17 in basal one. Dorsal carina of tibia reaching almost to base, ending apically in a small pad. Fringe of hairs distally along lower margin. Femur stout with dense patch of long hairs on inner margin. Eight to nine rows of stridulatory teeth on inner surface, partially concealed by hair patch. Row of spines extending from hair patch to outer apical angle of femur. Dorsal surface bearing 2 long, stout spinelike hairs about one-third way back. Foreleg of female: pala long and slender, tapering to point. Tibia smoothly joined to pala, about two-thirds as long as pala; bordered apically with fringe of spines. Femur slender, with circular patch of fine hairs on inner basal surface. Row of stout spines extending from outer edge of hair patch to apical end of femur. A couple of stout spinelike hairs on dorsal margin near apical border of femur. Middle and hind legs slender. Claw of middle leg shorter than its tarsus. Hind femur without row of spines on inner dorsal margin. Relation of segment to segment as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 47.3 : 38 : 27.8; Hind leg: femur : tibia : tarsus 1: tarsus 2 :: 100 : 85 3 : 104.4 : 38.6. Seventh abdominal segment of male without a lateral production on the right tergite. For details of male abdomen and genitalia see Plate LXXIV, figs. 3e and 3d.

Comparative notes: Females of this species are indistinguishable from those of *noorvikensis* and *producta* except on the basis of locality. Males can be distinguished from those of *producta* and *noorvikensis* by having pala thicker at middle than at base as seen from above.

Location of types: Described from five specimens from Sachalien. Through the kindness of Doctor T. Esaki I have these types before me—two males and three females. These will be returned to him.

Data on distribution: (Plate LXXVIII.) In the K. U. collections we have 2 specimens, a male and a female, from "North Manchuria, Cheng-Chin, Lesser Khingan, June 22, 1938, A. S. Loukashkin"; Sakaehama (Saghalien) July 20, 1922, Tieso Esaki, 5 females.

Callicorixa producta producta (Reuter)

(Plate LXXIV, figs. 1, 1a-1e)

1880. *Corisa praeusta producta* Reuter, O. M. Medd. Soc. F. Fl. Fenn. V, p. 193. (For other references up to 1927 see Lundblad 1927.)

1927. *Callicorixa producta,* Lundblad, O. Ento Tidskrift, XLVIII, Haft 2, pp. 85-89, text figs. 5, 6, 7, Pl. III, fig. 21, Pl. IV, figs. 22-28, Pl. VII, figs. 50-53.

1932. *Callicorixa producta,* Lindberg, Hakan Memoranda Societatis pro Fauna et Flora Fennica VII, p. 223.

1935 *Sigara (Callicorixa) producta,* Poisson, R Archives de Zool. Exp. et Gén., LXXVII, p. 556, fig. 78.

1935. *Sigara (Callicorixa) producta,* Stichel, Wolfgang. Illustrierte Bestimmungstabellen der Deutschen Wanzen, Lief. II, p. 318, figs 764 to 766.

1935. *Sigara (Callicorixa) producta,* Stichel, Wolfgang. As above, Lief 12, p. 331 (System. Katalog.)

1936. *Sigara (Callicorixa) producta,* Poisson, R. Bull. de la Soc. Sci. de Bretagne XIII, Fasc. 1 and 2, p. 12.

1936. *Callicorixa producta,* Lundblad, O. Ent Tidskrift, Haft 1, p 59

1936 *Sigara producta,* Lindberg, Hakan Die Tierwelt der Nord und Ostsee, Lief. 30, p. 114.

Size: Length 6.4 mm. to 7.1 mm. Head width 1.9 mm. to 2.2 mm. General shape slender.

Color: General facies medium brown. Pronotum crossed by 9-10 brown bands, narrower than pale bands. Claval pattern in transverse series, the brown bands forked and somewhat irregular. Corial patterns more broken, tending to coalesce at inner apical angle, and fading out at outer apical angle. Membrane separated from corium by pale line, pattern obscure and much broken. Embolium yellowish white. Head, limbs, and abdominal venter yellow, thoracic venter smoky to black. First tarsal segment of hind leg with black spot on distal fourth. Second tarsal segment yellow throughout.

Structural characteristics: Head about half as long as pronotal disk; vertex rounded out between eyes; facial hairs few; male fovea broad but shallow; synthlipsis wider than width of an eye; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 12 : 30 : 20 ♂ ; 1 : 2 : 3 : 4 :: 24 : 12 : 32 : 24 ♀ . Pronotum with faint median carina on anterior fourth; rastrate; pointed apically. Hemelytra coarsely rastrate, with a few short, pale hairs, mostly along inner margins of clavi and on membrane, a few scattered over corium.

Lateral lobe of prothorax about half as broad as long and squared across tip. Mesoepimeron narrow with osteole near tip. Metaxyphus almost as wide at base as long, apex sharply pointed. Foreleg of male: Pala with sides nearly parallel, apex bluntly rounded from dorsal margin to claw. Two rows of pegs, the apical row lying along the apical margin of pala, consisting of about 12 teeth, and not overlapping basal row, which has about 18-20 teeth. Upper palmar row of bristles interrupted apically and having about 4 teeth inserted near claw. Dorsal margin of pala evenly curved throughout its length.

Tibia with dorsal carina extending almost from base, terminating apically in a small pad. A row of short, spine-like hairs on lower margin, extending about half way from distal margin to base.

Femur relatively slender, with patch of long hairs on inner surface near base. Row of stout spines extending from distal end of hair patch to apex of femur. Two stout, long hairs on dorsal surface of femur, about one-third of way from distal margin.

Foreleg of female: Pala elongate, slender, tapering to point. Tibia about half the length of pala; with row of spines along apical margin. Femur slender; patch of short hairs on inner surface; row of spines extending from hair patch to apex of femur.

Middle and hind legs slender. Hind femur without row of short spines on inner dorsal margin. Middle claw shorter than its tarsus. Comparative measurements of segments: middle leg: femur : tibia : tarsus : claw :: 100 : 50.8 : 35.4 : 30.8; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 84 : 104.4 : 38.6. Right lateral lobe of seventh segment with a slight projection. See Plate LXXIV, fig. 1e. For details of genitalia see Plate LXXIV, fig. 1d.

Comparative notes: This species is closest to *noorvikensis* and *sackalinensis,* the females being indistinguishable except on the basis of locality. The males can be distinguished from *sackalinensis* by having pala thicker at base than at middle, and from *noorvikensis* by having dorsal surface of pala evenly curved throughout.

Location of types: According to W. Horn in his "Über den Verbleib der entomologischen Sammlungen der Welt" Reuter's collections of Hemiptera are in the Zool. Mus., University of Helsingfors. Doctor Lundblad, 1927, apparently saw the type from Åland.

Data on distribution: (Plate LXXVIII.) Doctor Lundblad, 1927, in his text figure 7 gives the distribution of this species in the Scandinavian peninsula. We have, through the kindness of Doctor Lindberg, the following specimens which are mostly from Lapland: Konosero, Edgren, 1 female; Fl. Jenisey, Lt. 68°, 35′, Lusino 1 male; Fl. Lutto, B. Poppius, 2 females; Imandra Chibinä, 1 male, 3 females; Rovaniemi, J. Sahlb., 1 male, 1 female; Solovetsk, Edgren., 2 females; Solovetsk, Levander, 1 male, 2 females; Kuusamo, Envald., 2 females; Fl. Ponoj. med. Palmen., 1 male; Tetrina, Levander, 3 males, 2 females; Tetrina Edgren., 3 females; Kola, Palmen., 2 males, 3 females; Varsuga, Levander., 3 males, 1 female; Varsuga Edgren., 2 males, 2 females; Patsjoki, B. Poppius, 5 females; Lapp. kem. Enwald., 3 females; Osnatjenn. Hammarstr., 2 females; Merasjärvi B. Poppius, 1 male; Olenitsa, Levander, 1 female; M. Alb. Levander., 1 female; Jeretik Levander, 1 female; Tschapoma, Edgren., 1 male; Enare, B. Poppius, 1 female; Saariselkä B. Poppius, 1 female; Lac Kimi, J. Sahlb., 1 female; Utsjoki, B. Poppius, 1 female; Kusomen, Levander, 2 males.

We also have one male from Varberg, Sweden (from O. Lundblad).

Callicorixa producta noorvikensis Hungerford

(Plate LXXIV, figs. 2, 2a to 2e)

1926 *Callicorixa noorvikensis* Hungerford, H B Ann Ent Soc Amer XIX, p 462, Pl. XXXIV, figs 4 and 7

1948. *Callicorixa noorvikensis*, McClure, H Elliott Ecological Monographs XIII, p 14 (permanent pools; eggs in June, new adults in early August).

Size: Length 6.7 mm. to 7.7 mm. Head width 1.9 mm. to 2.2 mm. General shape slender.

Color: General facies medium brown. Pronotum crossed by about a dozen fine, irregular brown lines. Lines of clavus arranged in regular series; those of corium more broken and irregular; membranal pattern mottled, separated from corium by pale line. Embolium yellowish white. Head and limbs yellow. Black spot on hind leg restricted to inner margin of apical fourth of first tarsus. Thoracic venter black, abdominal venter yellow.

Structural characteristics: Head about one-third as long as pronotal disk; vertex slightly produced; facial hairs few; male fovea broad but shallow; synthlipsis wider than width of an eye. Antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 18 : 43 : 33 ♂; 1 : 2 : 3 : 4 :: 22 : 20 : 42 : 33 ♀. Pronotum with carina plainly visible on anterior third; pronotum and hemelytra strongly rastrate, the latter with numerous short, pale hairs, longer on membrane and inner margins of clavi. Lateral lobe of prothorax about half as wide as long, squared across apex. Mesoepimeron narrow with osteole near the tip. Metaxyphus about as broad as long, tapering to a point apically. Foreleg of male: pala only slightly longer than tibia; inner margin of dorsal surface curved abruptly outward before apical third; pegs in two rows, the upper overlapping the lower. Ten to twelve teeth in upper row, thirteen to fourteen teeth in lower row. Teeth of lower row not approaching apex of tibial pad, remote from it. Upper palmar row of bristles interrupted apically with 3 or 4 stouter bristles inserted near claw.

Tibia with thin, dorsal carina extending from apex almost to base. Pad of moderate size, outlines on basal edge with row of bristles. Femur relatively slender, with dense patch of long hairs on inner surface about half way from base. Row of stout spines extending from distal edge of hair patch to apex of femur. On dorsal margin of femur a pair of long hairs on apical third. Foreleg of female: pala long and slender, tapering to point. Tibia about two-thirds as long as pala, the inner surface with 2 long, stout hairs, the apical margin with row of spines. Femur slender with stiff hairs on inner surface arranged in groups of 2 or 4. Patch of short hairs on inner basal surface. Dorsal margin with 2 long hairs on apical third. Middle and hind legs slender. Middle leg with claw slightly shorter than tarsus. Hind femur without spines on dorsal margin. Segmentation: Middle leg: femur : tibia : tarsus : claw :: 100 : 51 : 36.8 : 33.8; Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 82.1 : 111 : 46.6. Male asymmetry dextral, strigil absent. For details of male abdomen and genitalia see Plate LXXIV, figs. 2e and 2d.

Comparative notes: This species most closely resembles *producta* (Reuter) from which it differs in having the male pala broader and in having the inner margin of dorsal surface of male pala curved abruptly outward before apical third. The females are indistinguishable from the standpoint of structural differences. Since *C. producta* is European while *noorvikensis* is a North American species, localities will serve to separate the females at present.

Location of types: Described from 70 specimens labeled Kobuk river, Aug. 6, 1925, P. Scott, Noorvik, Alaska. Holotype, allotype and paratypes in the Francis Huntington Snow Collections, University of Kansas, Lawrence, Kansas.

Data on distribution: (Plate LXXVIII.) Besides the type series we have the following:

SIBERIA: Bering Id., 1882-'83, L. Stejneger, collector, 4 males, 6 females (U. S. N. M.); pond near Kolyma River, Sept., 1914, 1 male, 1 female.

ALASKA: Aleutian Islds., June, 1944, Bernard McDermott, 3 males, 4 females.

CANADA: *Yukon Territory:* White Horse, May 7, 1912, Jessup (Parshley) 1 female.

Manitoba: Churchill, Lake Isabella, June 9, 1936, H. E. McClure, 2 males, 6 females, and on June 29, 6 females.

Callicorixa praeusta (Fieber)

(Wash drawing No. 28 on Plate VI and Plate LXXIII, figs. 1, 1a-1d)

1848. *Corisa praeusta* Fieber, F. X. Bull. Soc. Nat. Mosc., XXI, Pt 2, p 521, Pl. 10, figs. 14, 22. (For other references up to 1927 see Lundblad below)

1927. *Callicorixa praeusta*, Lundblad, O. Ent. Tidskrift, XLVIII, Haft 2, pp. 80-83, text figs. 1, 2, Pl. VI, figs. 37-45, Pl. VII, figs. 47, 48.

1928. *Callicorixa praeusta*, Hungerford, H. B Ann. Ent. Soc. Amer. XIX, p. 462.

1930 *Sigara (Callicorixa) praeusta*, Jones, H P. Entomologists Record, XL-XLII, reprint, p. 76.

1933 *Callicorixa praeusta*, Prokofiewa, Alexander. Zeitschrift für Zellforschung und Mikroskopische Anatomie XIX, Hefte 1, p. 10, abb. 7a-b (chromosome study).

1935. *Sigara (Callicorixa) praeusta*, Poisson, R Archives de Zool. Exp. et Gén LXXVII, pp. 554-555, fig. 76.

1935. *Callicorixa praeusta*, Von Mitis, Heinz Zeitschrift für Morphologie und Ökologie der Tiere XXX, Heft 4, p 487 (stridulation).

1935. *Sigara (Callicorixa) praeusta*, Stichel, Wolfgang Illustrierte Bestimmungs—Tabellen der Deutschen Wanzen, Lief 11, p. 319, figs 767 to 772. Also Lief 12, p 331 (Syst. Katalog)

1936. *Sigara praeusta*, Lindberg, Hakan Die Tierwelt der Nord und Ostsee, Lief 30, p. 114, fig. 7.

1936. *Sigara (Callicorixa) praeusta*, Poisson, R. Bull. de la Soc. Sci. de Bretagne XIII, Fasc. 1 and 2, pp. 11-12

1936 *Callicorixa praeusta*, Walton, G A. Ent. Mo. Mag. LXXII, p 20 (occurs sparingly in Somerset)

1936. *Callicorixa praeusta*, Lundblad, O Ent. Tidskrift LVII, Häfte 1, p 59 (ecol. note).

1937 *Callicorixa praeusta*, Thompson, Gordon B. Ent Mo. Mag LXXIII, p. 163.

1937 *Callicorixa praeusta*, Wagner, Eduard. Verhandl des Ver. f naturw Heimatforschung zu Hamburg XXV, p. 63.

1938. *Sigara praeusta*, Michalk, Otto. Sitzungsberichte der Naturforschenden Gesellschaft zu Leipzig, 63-64 Jahrgang 1938, p. 164.

1938 *Sigara (Callicorixa) praeusta*, China, W. E Ent. Mo. Mag LXXIV, p 38.

1939. *Sigara praeusta*, Macan, T. T Freshwater Biol Assoc. of British Empire Sci. Pub No. 1, p. 17, figs. 19A, 20B, 21B, 22K.

1939. *Sigara (Callicorixa) praeusta*, Wroblewski, A. Fragmenta Faunistica Musei Zoologici Polonici IV, p. 118.

1942 *Corixa (Callicorixa) praeusta*, Walton, G. A. Trans. Roy. Ent. Soc London, XCII, No 2, pp. 429-30, figs. 11a-d, 26 h-j; 12d.

1946? *Corixa praeusta*, Brown, E. S Trans. Dumfriesshire and Galloway Nat. Hist and Antiquarian Soc. XXIII, p. 7.

Size: Length 6.1 mm.-6.8 mm. Width of head 1.9 mm.-2.1 mm.

Color: General facies brown. Pronotum crossed by about 10 brown lines, slightly narrower than pale areas. Brown lines of clavus and corium more or less regular, tending to coalesce on inner apical angle of corium. Membrane separated from corium by pale band. Membranal pattern mottled and confused. Embolium yellow to smoky. Head and limbs yellow; first tarsal segment of hind leg with black spot on distal third, no black on second tarsal segment. Venter smoky to black.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex rounded; facial hairs few; male fovea broad but shallow; synthlipsis equal to width of an eye. Antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 18 : 47 : 30 males; 1 : 2 : 3 : 4 :: 25 : 18 :

43 : 30 females. Pronotum with median carina visible on anterior third; rounded apically. Pronotum and hemelytra heavily rastrate, the latter with a few fine pale hairs on membrane. Pruinose area of claval suture narrow as compared to those of *C. tetoni* n. sp. and *C. alaskensis* Hungerford.

Lateral lobe of prothorax about half as wide as long and rounded apically. Mesoepimeron narrow, osteole close to tip. Metaxyphus longer than broad, tapering to sharp point. Foreleg of male: Sides parallel at base, curving outward on dorsal margin about midway. Distal edge thin and curved inward. Dorsal margin concave before curve. Teeth divided into two rows, the distal row not overlapping basal row. The former with about 10 teeth, the latter with about 18 teeth close to upper palmar row and extending almost to tibial pad. Upper palmar row of bristles interrupted apically with about 4 teeth inserted near claw. Tibia with pronounced dorsal carina ending apically in a large pad and extending backward about two-thirds of way to base. About two-thirds as long as pala. Femur relatively slender with patch of stridulatory pegs in about 10 rows on inner surface near base. Row of spines extending from apical margin of pegs to apical margin of femur. Foreleg of female: Pala long and slender, tapering to a point. Tibia about half as long as pala, wedge-shaped, narrower at base than at apex. Femur slender with patch of fine hairs on inner basal surface. Row of spines extending from distal end of patch to apex of femur. Middle and hind legs slender. Middle claw equal to tibia. Hind femur without row of spines on dorsal margin. Relation of segments: Middle leg: femur : tibia : tarsus : claws :: 100 : 46.5 : 33.8 : 33.8; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 86.1 : 107.2 : 46.6. Right tergite of seventh abdominal segment with sharp lateral production. For details of male abdomen and genitalia see Plate LXXIII, figs. 1a and 1c.

Comparative notes: This is a European species and the only American species that is near it is *C. vulnerata* (Uhler). However, the male palae are unlike and the females have the pruinose area of claval suture narrow instead of broad as in the American species.

Location of types: Fieber, in describing this species, gave as its distribution "In Böhmen, Preussen (Breslau, Scholz) Sachsen, Russland (Kason, Eversmann; Petersburg, Kolenati) Lappland (Kretschmar) Sitkha (Berlin Mus.) Unalascka (Chamisso)." The last two records must be based on misidentified specimens that are probably *C. alaskensis* Hungerford.

Data on distribution: (Plate LXXVIII.) This widely distributed European species does not occur in North America. We have specimens from the following places:

BRITISH ISLES:

Forres, Scotland, 3 males, 6 females.

England, P. Shobdon, Oct. 6, 1935, G. A. Walton, 2 males, 2 females.

N. Wales, Bodesi, Llyn Ogwen, Caernarvon Co., Peat Diggings, April, 1935, G. A. Walton, 1 male, 1 female; N. Wales, Snowdonia, Caernarvon Co., small lake, April 21, 1935, G. A. Walton, 1 male, 2 females; N. Wales, N. R. Banger Llyn Cororion, April, 1935, G. A. Walton, 29 males, 29 females.

SWEDEN: Upsala, Aug. 20, 1928, Linnean Garden pool, H. B. Hungerford, 1 male, 4 females.

POLAND: Aug. 12, 1922, T. Jaczewski, 3 males, 2 females.

RUSSIA: Przhevalsk, Pedatenko, 3 males, 1 female.

Callicorixa vulnerata (Uhler) 1861

(Plate LXXIII, figs 2, 2a to 2i)

1861. *Corixa vulnerata* Uhler, P R Proc Acad Nat Sci Phila, XIII, p 284 (Desc from Washington Terr.).

1876 *Corixa vulnerata*, Uhler, P R Bull. U. S Geol. Geog. Surv I, No. 5, p. 340

1876. *Corixa vulnerata*, Uhler, P R. Reprint of above, separately paginated, p 74 (Mont, Ore., N Ill. and N. W. Terr. of U. S.).

1878. *Corisa vulnerata*, Uhler, P. R Bull. U. S Geol. Geog Surv. IV, p. 509 (Milk River, Montana).

1909 *Arctocorisa vulnerata,* Kirkaldy, G. W, and Torre-Bueno, J. R. de la. Catalogue *in* Proc Ent. Soc. Wash X, p 197.

1917 *Arctocorixa vulnerata*, Van Duzee, E. P Catalogue of the Hemiptera, p 485.

1926 *Arctocorixa vulnerata*, Blatchley, W S Heteroptera of Eastern North America, p. 1081.

Size: Length 7.1 mm. to 8.1 mm. Width of head 2.2 mm. to 2.5 mm. General shape slender.

Color: General facies medium to dark brown. Pronotum crossed by 9-10 brown lines equal in width to pale ones. Claval lines narrow and regular at base, broader and irregularly furcate distally. Dark bands of corium broken and irregular throughout; not coalescent at inner apical angle. Membrane separated from corium by pale line, pattern reticulate. Embolium yellow to smoky. Head and limbs pale, except for black spot on apical third of first tarsal segment of hind leg. Venter smoky to black. Dorsal surface of tibia of foreleg heavily infuscated.

Structural characteristics: Head about half as long as pronotal disk; vertex rounded; facial hairs few; synthlipsis greater than width of an eye; male fovea broad but not deep; antennal segmentation: 1 : 2 : 3 : 4 :: 28 : 18 : 47 : 30 ♂ ; 1 : 2 : 3 : 4 :: 28 : 20 : 42 : 30 ♀. Pronotum rounded apically. Median carina visible on anterior third. Pronotum and hemelytra moderately rastrate, the latter with a few long hairs on corium and membrane. In female, patterned portion of basal angle of corium extending about two-thirds of way along pruinose area of claval fold. Lateral lobe of prothorax with sides parallel in female, tapering slightly in male, about half as wide as long. Mesoepimeron narrow, osteole near tip. Metaxyphus a little longer than wide, bluntly pointed apically. Front leg of male: pala bluntly rounded apically from dorsal margin to claw. Pegs in two rows, the distal row consisting of about twelve teeth, not overlapping basal row of about twenty-four teeth. Apical two or three teeth of basal row sometimes out of line, curving dorsally toward distal row. Upper palmar row of bristles interrupted apically and one to three pegs inserted close to claw. Tibia about two-thirds as long as pala. Dorsal carina pronounced, arising almost at base and terminating distally in a large round pad. A fringe of spines bordering distal margin of tibia below pad. Femur relatively slender with pilose area on inner basal margin A few rows of stridulatory teeth scattered among hairs. A row of spines extending from distal edge of hair patch to apical margin of femur. Dorsal margin without a pair of stout spinelike hairs Foreleg of female: pala of usual shape. Tibia with a fringe of spines along apical margin. Femur slender with patch of short hairs on inner basal margin and a row of spines extending from patch to apical margin. Dorsal margin without a pair of stout, spinelike hairs. Middle and hind legs slender, the middle leg with its claw equal in length to the tarsus. Relation of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 44.9 : 33 : 33. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.8 : 111 : 51.1. The dorsum of abdomen and genital capsule of male as shown on Plate LXXIII.

Location of types: In the Uhler collection of the U. S National Museum are two females labeled "*Corisa vulnerata* Uhler, N. W. B. Surv., Dr. Kennerly." These are labeled by Uhler and are the specimens from which the description was drawn. One of these females may stand as the lectotype and is now so labeled. Since the male has not been described, we have selected a male allotype and six parallotypes labeled "Arlington, Washington, 7-28-1931, L. D. Anderson." These were taken with 11 females from the same place.

Data on distribution: (Plate LXXVIII.) This species was described from Washington territory and the published records, all by Uhler, are Montana, Oregon, Northwest territories of the U. S. and N. Illinois. We cannot verify the Illinois record. We have before us the following:

UNITED STATES: *Washington:* Arlington, July 28, 1931, L. D. Anderson, 7 males, 11 females; Kalama R., July 21, 1931, L. D. Anderson, 1 female; Naches, July 7, 1935, R. H. Beamer, Jr., 1 female; Cliffdell, July 7, 1935, Jack Beamer, 1 female; Olympia, 1 female; Copalis, July 25, 1931, L. D. Anderson, 2 males, 2 females.

Oregon: Union, July 13, 1931, L. D. Anderson, 1 male; Hood R., July 17, 1931, L. D. Anderson, 1 male, 1 female; Portland, L. Levinson, December 9, 1895, 1 male, 1 female; Grants Pass, July 12, 1935, Jack Beamer, 2 males; Crater Lake Park, Pole Bridge Meadows, 6,000 ft., August 15, 1930, H. A. Scullen, 2 males, 2 females; Modoc Point, July 1, 1935, Jack Beamer, 8 males, 11 females; Florence, July 11, 1935, R. H. Beamer, 1 male, 1 female; Waldport, July 11, 1935, R. H. Beamer, 4 males, 3 females; Hot Lake, July 13, 1931, M. W. Sanderson, 2 females.

California: Berkeley, June, 1917, W. W. Henderson, 1 male, 1 female; California (P. R. Uhler Coll.), 1 male, 3 females; Eureka, July 15, 1935, R. H. Beamer, 7 males, 8 females; Mono Lake, May 12, 1917, C. L. Fox (Calif. Acad.); Tahoe, 1 mi. so., July 28, 1929, R. L. Usinger (Calif. Acad.).

Idaho: Burley, July 6, 1931, L. D. Anderson, 2 males, 2 females; Coolin, Priest Lake, July 18, 1927, E. C. Van Dyke (Calif. Acad.).

Montana: Anaconda, August 12, 1931, L. D. Anderson, 1 male; Gallatin Co., May, 1925, 1 female.

Utah: Fish Lake, August 16, 1929, L. D. Anderson, 3 males, 7 females; Pleasant Grove, April 4, 1930, G. F. Knowlton, 1 male; Lehi, April 4, 1930, G. F. Knowlton, 1 female; Benson Woods, April 8, 1930, G. F. Knowlton, 1 female; Provo Canyon, August 15, 1940, L. C. Kuitert, 1 female; Logan, July 19, 1922, E. P. Van Duzee (Calif. Acad.).

Wyoming: Boulder, August 19, 1931, L. D. Anderson, 16 males, 17 females; Grand Teton Nat'l Park, August 18, 1931, L. D. Anderson, 1 male, 1 female.

ALASKA: Popoff Island, Harriman Expedition, E. Kincaid, '99, 1 male.

CANADA: *British Columbia:* Bear Foot Mts., September 15, 1903 (Bueno Coll.), 1 male, 1 female; Mission, Nov. 4, 1925, W. Dounes

(Walley's record); Penticton, October 14, 1931, A. N. Gartrell (Walley's record); Peachland, October 7, 1931, A. N. Gartrell (Walley's record).

Callicorixa wollastoni (D. & S.)

(Plate LXXV, figs. 1, 1a to 1d)

1865. *Corixa wollastoni* Douglas and Scott. British Hem., p. 603. (For other references before 1927 see Lundblad below.)

1927. *Callicorixa wollastoni,* Lundblad, O. Ent Tidskrift, XLVIII, Háft 2, pp. 83-85, text figs. 3 and 4, Pl. V., figs. 29-36; Pl. VII, figs. 49-50.

1933. *Callicorixa wollastoni,* Prokofiewa, Alexandra. Zeitschrift für Zellforschung und Mikroskopische Anatomie XIX, Hefte 1, p. 11, Abb. 8a-d (chromosome study).

1935. *Sigara* (*Callicorixa*) *wollastoni*, Poisson, R Archives de Zool. Exp. et Gén., pp. 555-556, fig. 77.

1936. *Sigara* (*Callicorixa*) *wollastoni*, Poisson, R. Bull. de la Soc. Sci. de Bretagne, XIII, Fasc. 1 and 2, p. 12.

1936. *Callicorixa wollastoni*, Lundblad, O. Ent. Tidskrift LVII, Hafte 1, p. 59 (ecological note).

1938 *Sigara* (*Callicorixa*) *wollastoni*, China, W. E. Ent. Mo. Mag. LXXIV, p. 38

1939. *Callicorixa wollastoni*, Pearce, E. J., and Walton, G A. Trans. Soc. British Ent VI, Pt. 7, pp 158, 178.

1939. *Sigara wollastoni*, Macan, T. T. Freshwater Biological Assoc. of British Empire Sci Publ No. 1, p. 17, 25.

1942. *Corixa* (*Callicorixa*) *wollastoni,* Walton, G. A. Trans. Roy. Ent. Soc. London, XCII, No. 2, pp. 427-428, figs. 12e; 26a, b, e, i (*C. wollastoni wollastoni* and *C wollastoni caledonica*).

1943. *Corixa wollastoni*, Brown, E. S. Trans. Soc British Ent. VIII, Pt. 6, p. 174.

1948 *Corixa* (*Callicorixa*) *wollastoni*, China, W. E. The Generic Names of British Hemiptera Heteroptera . . . *in* The Generic Names of British Insects, Pt. 8, pub. by Royal Ent. Soc. London, p. 306.

1946? *Corixa wollastoni*, Brown, E. S. Trans. Dumfriesshire and Galloway Nat. Hist and Antiquarian Soc. XXIII, p. 7.

Size: Length 6.8 mm. to 7.8 mm. Width of head 2 mm. to 2.4 mm. General shape slender.

Color: General facies medium to dark brown. Pronotum with about 7 or 8 narrow dark bands. Interlying areas a little lighter and a little wider. Claval bands narrow at base and along median line, broader toward outer margin. Pattern of corium broken and irregular. Dark pattern obscure. Membrane separated from corium by pale line; pattern of membrane lighter in color than that of corium; dark lines reticulate. Embolium yellowish to smoky. Head, venter, and limbs pale except around coxae and for dark spot on apical fourth of first tarsus of hind leg. Dorsal surface of fore tibia lightly infuscated.

Structural characteristics: Head almost two-thirds as long as pronotal disk; rounded across vertex, facial hairs few, male fovea broad but shallow, synthlipsis exceeding width of an eye. Antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 20 : 45 : 30 ♂ ; 1 : 2 : 3 : 4 :: 28 : 18 : 45 : 30 ♀ . Median carina of pronotum visible on anterior third. Pronotum rastrate, rounded apically. Hemelytra rastrate with a few short hairs scattered over surface. In female, the patterned portion of basal angle of corium extending only half way along the pruinose area of the claval suture. Lateral lobe of prothorax about half as wide as long, sides nearly parallel. Mesoepimeron narrow, osteole near tip. Metaxyphus slender, a little longer than broad, and tapering to a point. Foreleg of male: pala rounded apically. Palar pegs in two rows, the apical one not overlapping basal one and consisting of about 14 pegs. Basal row consisting of about 16 pegs. Upper palmar row of bristles interrupted apically with 4 or 5 teeth inserted near claw. Tibia about two-thirds as long as pala. Dorsal carina pronounced, extending almost from base and ending apically in a small pad. Fringe of hairs below pad along margin of tibia. Femur relatively slender with patch of short hairs on inner basal surface. A row of spines extending from apical edge of patch to distal margin of femur. Without a pair of stout spine-like hairs on dorsal margin near apex. Foreleg of female: pala tapering to point apically. Tibia with fringe of spines along distal margin. Femur slender with oblong patch of fine hairs on inner basal surface and a row of spines extending from patch to apex of femur. No stout hairs on dorsal margin near apex. Middle and hind legs slender. Claw of middle leg equal in length to its tarsus. Hind femur without spines on inner dorsal margin. Relation of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 47.5 : 34.3 : 34.3; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.8 : 113.2 : 53.3. The male abdomen and genital capsule as shown on Plate LXXV.

Comparative notes: This European species runs to the same couplet in our key with *C. vulnerata* (Uhler) but the males are distinguished by the shape of the right claspers and the females by the pattern on the corium.

Distribution: (Plate LXXVIII.) Poisson, 1935, gives the distribution as Northern Europe, England, Holland, Scandinavia and Finland. Lundblad, 1927, p. 85, assigns a specimen sent him by Hungerford from Pingree Park, Colorado, to this species but we think the specimen must be either *C. vulnerata* (Uhl.) or *C. audeni* Hungfd. We have before us the following: "Denmark: Thorshavn, 2 males, 4 females; Inari J. Sahlb., 1 male, 2 females; Rovaniemi J. Sahlb., 1 female; Suma, Levander, 2 males, 2 females; Olenitsa, 1 female; Lapp. kem. Envald, 2 females; Imandra, Chibinä, 2 females; Solovetsk, Levander, 1 male; Osnatjenn, 1 female; Kittilä,

Sandman, 4 females; Fl. Pjosa, O. Killman, 1 male, 1 female; Konosera, 1 male, 1 female; Lac. Kemi, J. Sahlb., 3 females; Lac. Nourti, Envald., 1 female; Merasjärvi, 1 female; Sodankylä, 1 female; Solovetsk, 2 females; Nuortijärvi B. Poppius, 1 male; Fl. Lutto, B. Poppius, 1 male, 7 females; Norway-Aal-Strand, 2 males, 2 females [in Kirkaldy collection as *C. praeusta* (Fieb.)].

PLATE LXXIII

Callicorixa B. White

FIG. 1. *Callicorixa praeusta* (Fieber); front leg of male.
FIG. 1a. Dorsal view of male abdomen.
FIG. 1b. Tarsal segments of hind leg.
FIG. 1c. Genital capsule of male.
FIG. 1d. Right clasper of male.
FIG. 2. *Callicorixa vulnerata* (Uhler); hind femur of female.
FIG. 2a-2d. Palae of male showing variations.
FIG. 2e. Tarsal segments of hind leg.
FIG. 2f, 2g, 2i. Right clasper of male, showing variations.
FIG. 2h. Genital capsule of male.
FIG. 2j. Dorsal view of male abdomen.

PLATE LXXIII

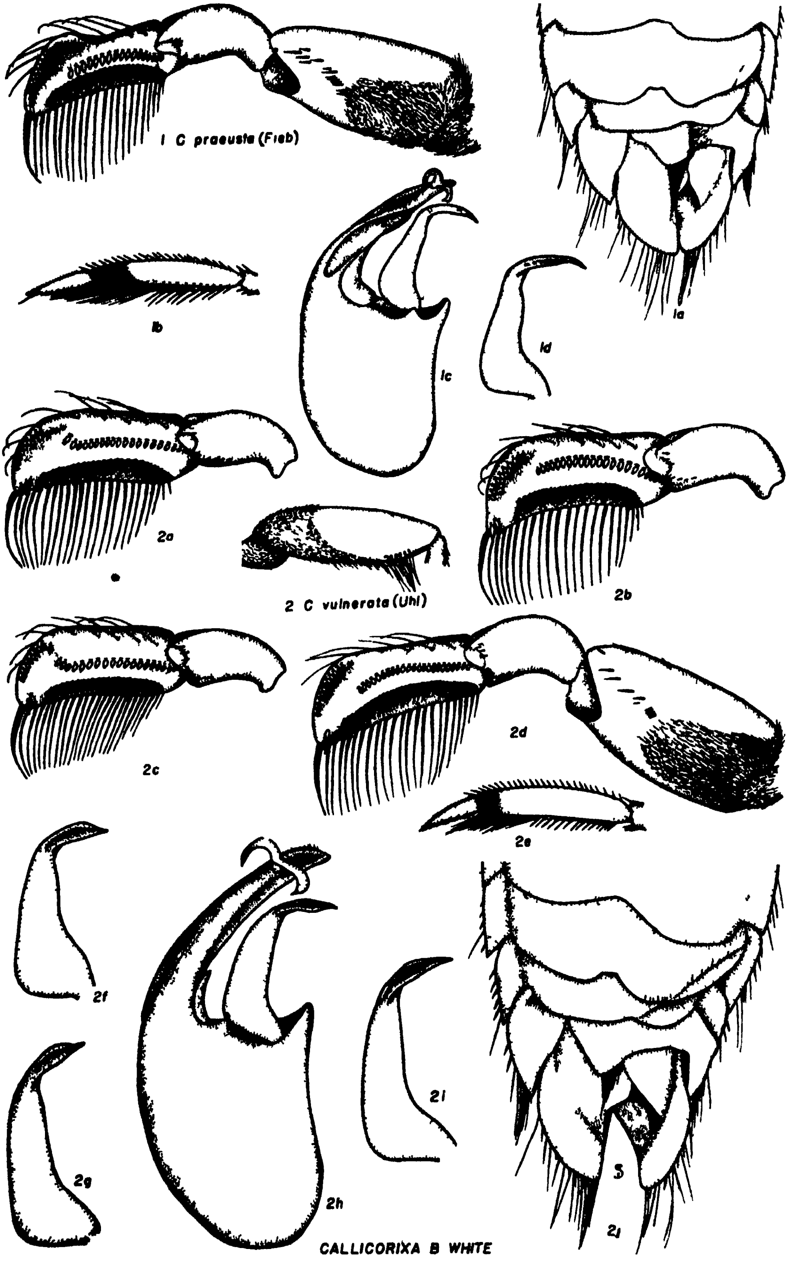
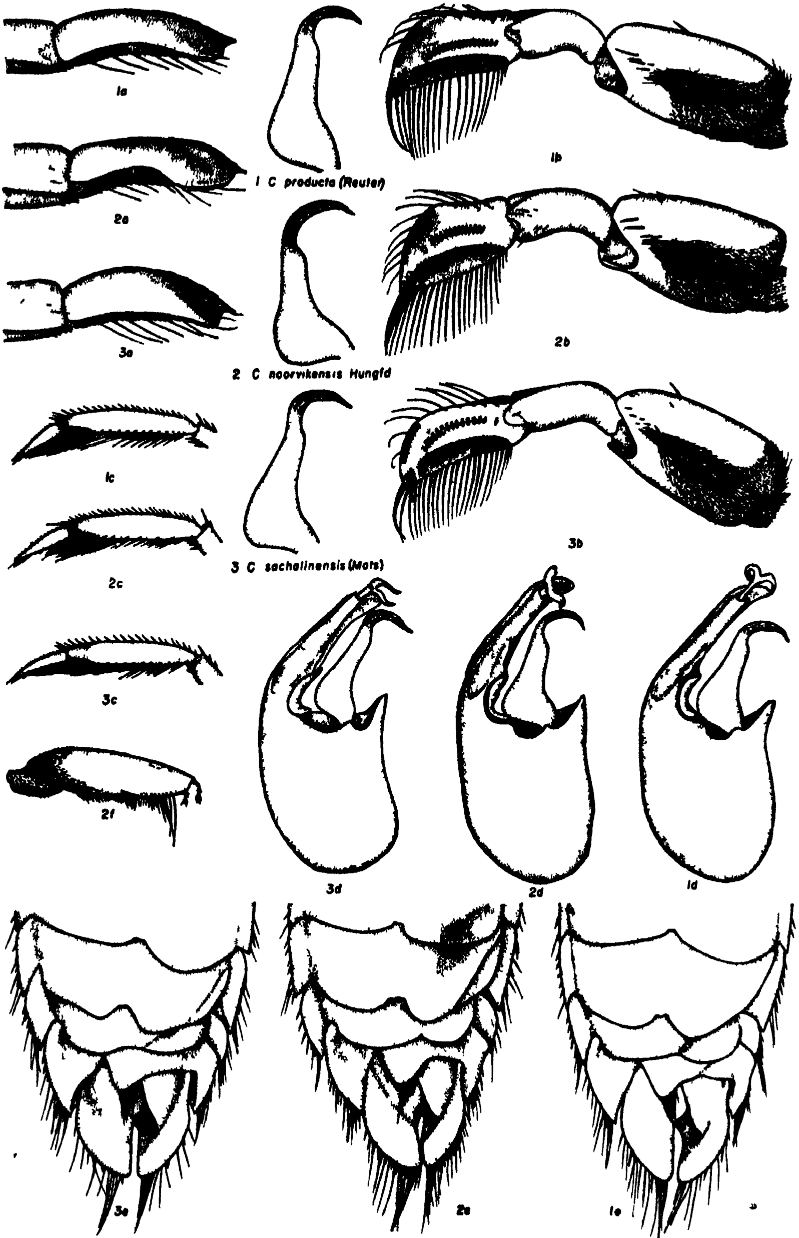


PLATE LXXIV

Callicorixa B. White

Fig. 1. *Callicorixa producta* (Reuter); right clasper of male.
Fig. 1a. Dorsal view of male pala.
Fig. 1b. Front leg of male.
Fig. 1c. Tarsal segments of hind leg.
Fig. 1d. Genital capsule of male.
Fig. 1e. Dorsal view of male abdomen
Fig. 2. *Callicorixa producta noorvikensis* Hungerford; right clasper of male
Fig. 2a. Dorsal view of male pala.
Fig. 2b. Front leg of male.
Fig. 2c. Tarsal segments of hind leg.
Fig. 2d. Genital capsule of male
Fig. 2e. Dorsal view of male abdomen.
Fig. 2f. Hind femur of female.
Fig. 3. *Callicorixa producta sackalinensis* Matsumura; right clasper of male.
Fig. 3a. Dorsal view of male pala
Fig. 3b. Front leg of male.
Fig. 3c. Tarsal segments of hind leg.
Fig. 3d. Genital capsule of male.
Fig. 3e. Dorsal view of male abdomen

PLATE LXXIV



CALLICORIXA B WHITE

PLATE LXXV

Callicorixa B. White

FIG. 1. *Callicorixa wollastoni* (Douglas & Scott); front leg of male.
FIG. 1a. Right clasper of male.
FIG. 1b. Genital capsule of male.
FIG. 1c. Tarsal segments of hind leg.
FIG. 1d. Dorsal view of male abdomen.
FIG. 2. *Callicorixa alaskensis* Hungerford; front leg of male.
FIG. 2a. Front femur of female.
FIG. 2b, 2c. Genital capsule of male showing aberrant claspers (Kodiak, Alaska).
FIG. 2d. Right clasper of male.
FIG. 2e. Genital capsule of male.
FIG. 2f. Tarsal segments of hind leg.
FIG. 2g. Dorsal view of male abdomen.

PLATE LXXV

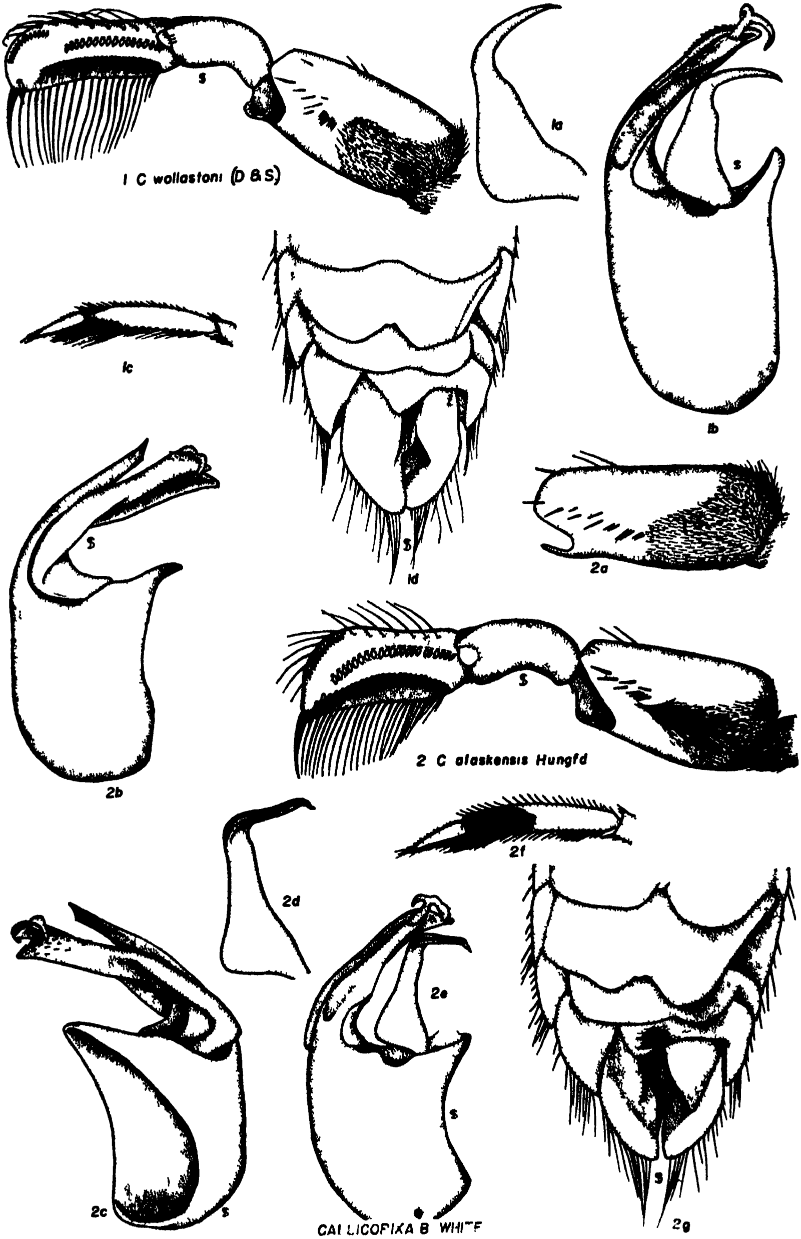
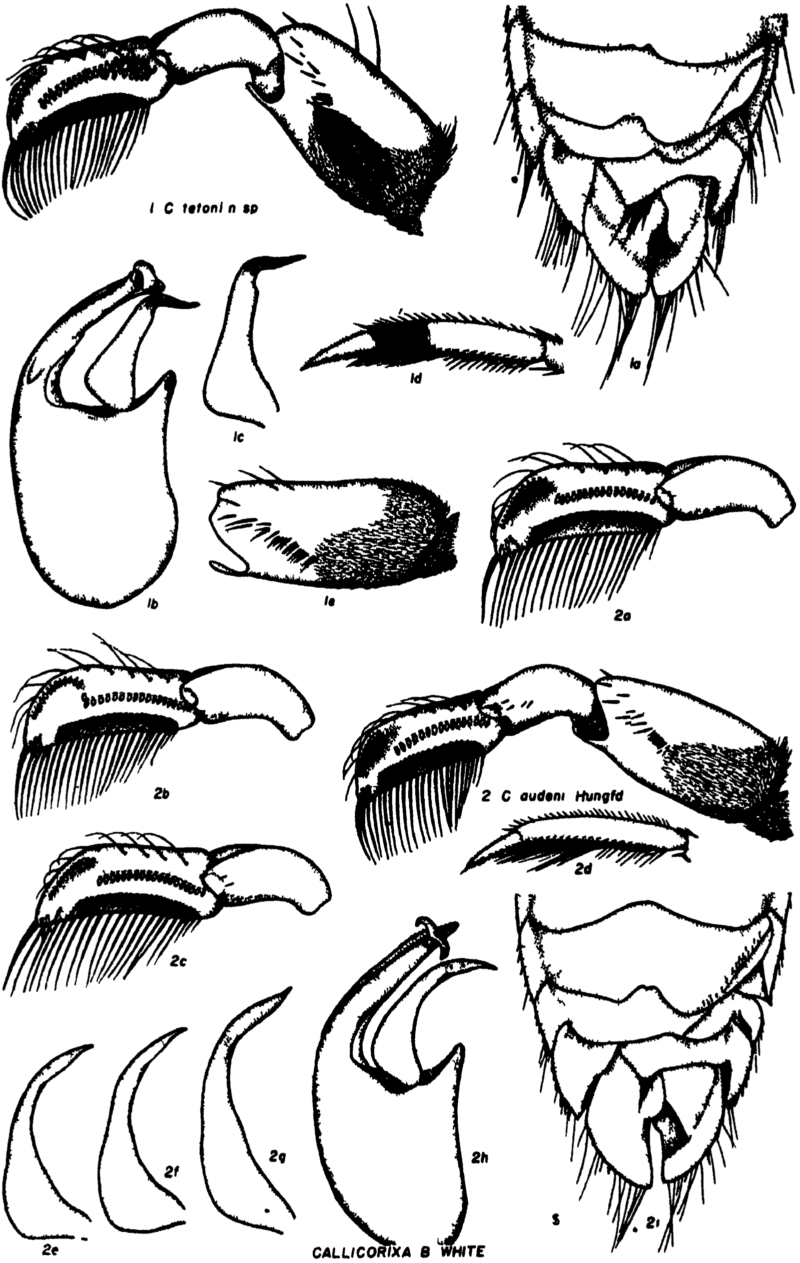

s
1 C wollastoni (D & S)
1a
s
1b
1c
s
1d
2a
s
2b
s
2 C alaskensis Hungfd
2f
2d
2e
s
s
2c
s
2g
CALLICORIXA B WHITE

PLATE LXXVI

Callicorixa B. White

FIG. 1. *Callicorixa tetoni* n. sp.; front leg of male.
FIG. 1a. Dorsal view of male abdomen.
FIG. 1b. Genital capsule of male.
FIG. 1c. Right clasper of male.
FIG. 1d. Tarsal segments of hind leg.
FIG. 1e. Hind femur of female.
FIG. 2. *Callicorixa audeni* Hungerford; front leg of male
FIG. 2a-2c. Palae of male showing variations.
FIG. 2d. Tarsal segments of hind leg.
FIG. 2e-2g. Right clasper of male, showing variations.
FIG. 2h. Genital capsule of male.
FIG. 2i. Dorsal view of male abdomen.

PLATE LXXVI



CALLICORIXA B WHITE

PLATE LXXVII

Callicorixa B. White

FIG. 1. *Callicorixa** *concinna* (Fieber); dorsal view of male abdomen.
FIG. 1a. Tarsal segments of hind leg.
FIG. 1b. Right clasper of male.
FIG. 1c. Front leg of male.
FIG. 1d. Genital capsule of male.
FIG. 2. *Callicorixa gebleri* (Fieber); dorsal view of male abdomen.
FIG. 2a. Tarsal segments of hind leg.
FIG. 2b. Right clasper of male.
FIG. 2c. Front leg of male.
FIG. 2d. Genital capsule of male.

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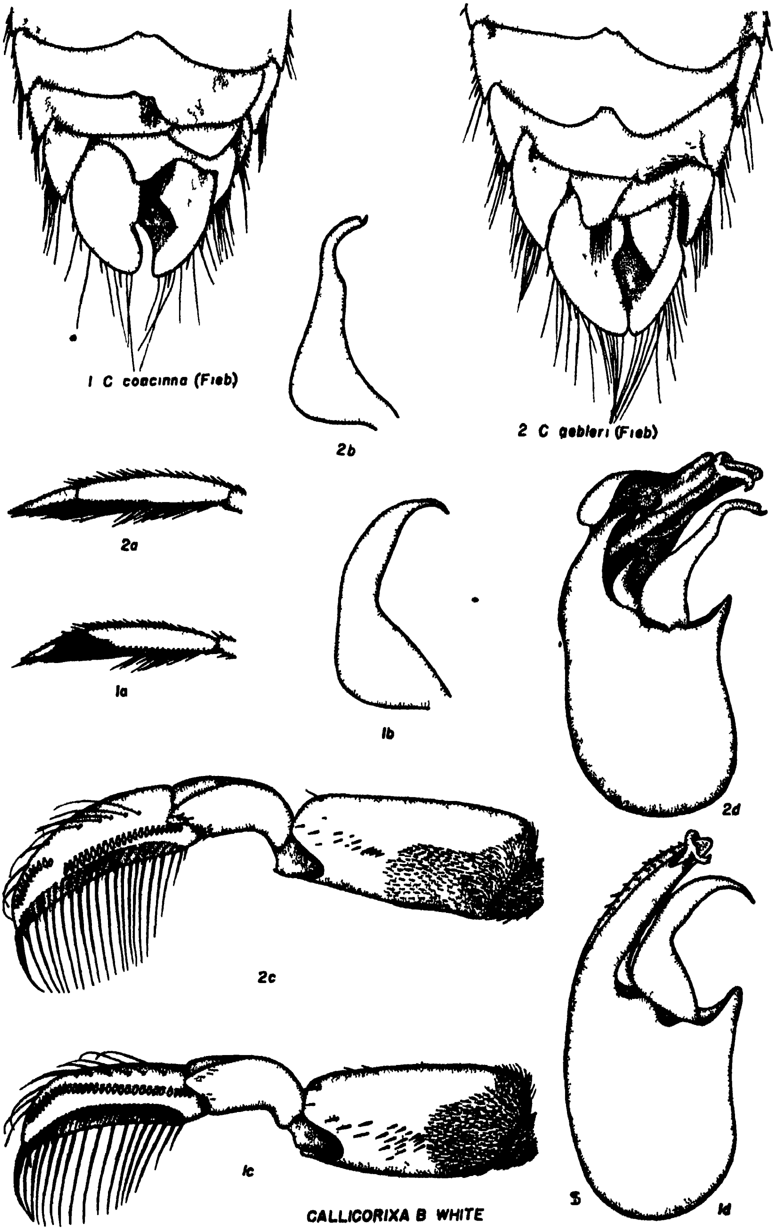
* We do not believe *concinna* to be a true *Callicorixa*.

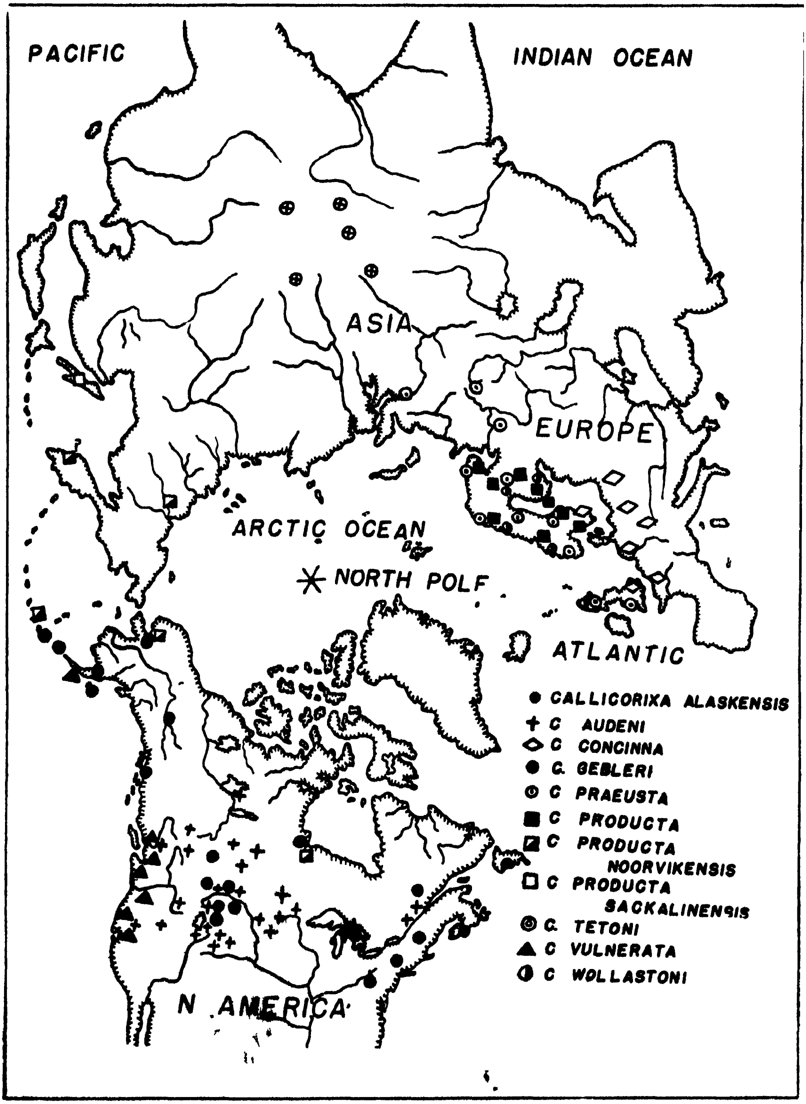
PLATE LXXVII


1 C concinna (Fieb)

2 C gebleri (Fieb)

CALLICORIXA B WHITE

PLATE LXXVIII



Hesperocorixa Kirkaldy

(Including *Anticorixa* Jaczewski)

Hesperocorixa (*Hesperocorixa*)

1908. Kirkaldy, G. W Canadian Ent XL, pp. 118-120 (new subg. of *Arctocorisa* haplotype *H. brimleyi* Kirk)

1917. Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico, p 485.

1926 Blatchley, W. S. Heteroptera of Eastern North America, pp. 1065 and 1081 (gives generic rank).

1928. Hungerford, H. B Annals Ent Soc. Amer. XXI, p. 140

1928. Jaczewski, T. Annales Musei Zoologici Polonici VII, pp. 55-58

1935. Poisson, R. Archives de Zoologie Expérimentale et Générale LXXVII, p 458

Hesperocorixa (*Anticorixa*)

1924. Jaczewski, T. Annales Zool. Musei Polonici Hist. Nat III, pp 76, 83-84 (*Anticorixa* as subg. of *Callicorixa sens lat.* with *C. sahlbergi* Fieb. as subgeneric type)

1935 Poisson, R Archives de Zoologie Exp. et Gén LXXVII, p 504 (as subg in *Sigara*)

1935. Stichel, W. Illustrierte Bestimmungs-Tabellen der Deutschen Wanzen, Lief 11, pp. 313-317, Lief 12, p 331 (as subg of *Sigara*)

1936. Poisson, R. Bull. de la Soc. Sci de Bretagne XIII, Fasc 1 and 2, p 6

1936. Jaczewski, T Proc Royal Ent Soc London, V, Pt. 2, Ser. B, p 40 (as subg in *Sigara* and redefines it Includes *C. kennecottii* Uhler which was shown to be very close to *Hesperocorixa brimleyi* Kirk. in 1928).

1938 China, W. E. Ent Mo Mag. LXXIV, p. 38 (as subg. of *Sigara*)

1940. Hutchinson, G E. Trans. Conn Acad. Arts and Sci XXXIII, p. 414 (as subg of *Corixa*).

1943 Walton, G. A. Trans. Soc. for British Ent. VIII, Pt. 5, p. 167 (as subg of *Corixa*)

1943. China, W. E The Generic Names of British Insects, Pt 8, p 306 (as subg of *Corixa*).

For the most part these corixids are larger than average in size. The pronotum is more or less rastrate in most species and the clavus and corium always show some rastrations even in *H. laevigata* (Uhler).

The pruinose area along the claval suture is shorter than the pruinose area beyond the nodal furrow, usually much shorter (one-third to one-half). The media vein usually reaches the nodal furrow. Lateral lobe of the prothorax trapezoidal, often obliquely truncate at the apex. The metaxyphus well developed and long in most species. Pala of the male subparallel-sided, with a distinct carina on its dorsal base, apex of pala blunt, rounded or truncated, the upper margin meeting the lower one more or less at right angles at the insertion point of the claw; one row of pegs repeating more or less the curvature of the upper margin. Front tibia of males always with a subapical spiniform bundle of stiff hairs. The dorsal surface of the hind femur may be bare or provided with several rows of short spines, none so far known with a single row as in *Corixa*. The male strigil relatively large and usually oblong, elliptical, and, on the right side, the males dextral. Tip of the genital capsule (ninth segment) of male usually considerably modified, penial sheath not modified as it always is in *Corixa.*

Genotype: *H. brimleyi* Kirkaldy.

The genus is holarctic in distribution. It is related to but generically distinct from *Corixa* Geoffroy. In a critical examination of material from eastern Asia, Europe and North America it is evident that *Hesperocorixa* Kirkaldy, 1908, and *Anticorixa* Jaczewski, 1924, are not only congeneric but that the group should be recognized as a generic group under the name *Hesperocorixa* Kirkaldy. Mr. Walton, in proposing to submerge all groups of *Sigara* under *Corixa,* argued that *H. laevigata* (Uhler), a large dextral, smooth-appearing species of North America, bridges the gap between *Corixa sens. str.* and *Anticorixa.* The color pattern of *H. laevigata* (Uhler) is typically that of *Corixa sens. str.* and in spite of its dextral males I would not hesitate to place it in *Corixa sens. str.* if it belongs there. However, while it is unique in certain particulars, it belongs with the *Hesperocorixa* and is not the connecting link that Walton thinks it is. Neither is *Corixa mirandella* Hutchinson, the smallest *Corixa sens. str.* which was described from Africa and which I mention on page 32.

KEY TO HESPEROCORIXA KIRKALDY

(American species)

1. Mesoepimeron at level of the scent gland osteole as broad as or broader than the lateral lobe of the prothorax 2
Mesoepimeron at level of the scent gland osteole plainly narrower than the lateral lobe of the prothorax 7

2. (1) Dorsal surface of hind femur armed with many spines 3
Dorsal surface of hind femur with only two or at the most three very stout spines .... *H. minorella* (Hungfd.) (p. 499)

3. (2) Mesoepimeron at level of osteole considerably broader than the lateral lobe of prothorax 4
Mesoepimeron at level of osteole about equal in width to the lateral lobe of prothorax .... *H. atopodonta* (Hungfd.) (p. 502)

4. (3) 7.5 mm. long or less 5
8 mm. long or more 6

5. (4) Corial pattern crossbanded .... *H. michiganensis* (Hungfd.) (p. 506)
Corial pattern in longitudinal series .... *H. semilucida* (Walley) (p. 508)

6. (4) Hemelytra but slightly rastrate; orange to red with large black spot on base of clavus and on distal portion of corium. Male pala not longitudinally carinate on outer surface, appearing thin in dorsal view..*H. brimleyi* (Kirk.) (p. 510)
Hemelytra rather strongly rastrate; clavus and corium either solid black or else with pale crossbands, never with spots. Male pala longitudinally carinate on outer surface, appearing thickened in dorsal view....*H. kennicottii* (Uhl.) (p. 512)

7. (1) Lateral lobe of prothorax narrow, plainly longer than wide; smaller species, less than 8 mm. long .... *H. minor* (Abbt.) (p. 514)

Lateral lobe of prothorax broader; species more than 8 mm. long 8

8. (7) Color pattern normal 9

Color pattern in part effaced, at least on corium .... *H. lucida* (Abbt.) (p. 517)

9. (8) Pronotal disk more than half as long as wide 10

Pronotal disk less than half as wide as long .... *H. escheri* (Heer) (= *scabricula* Walley) (p. 519)

10. (9) Pattern of hemelytra reticulate; surface of pronotum nonrastrate. *H. laevigata* (Uhler) (p. 521)

Hemelytral pattern not reticulate; surface of pronotum from faintly to strongly rastrate 11

11. (10) Pale bands of corium beyond hemelytral suture forming slender transverse series. Corium and membrane not plainly separated 12

Pale bands of corium beyond hemelytral suture not forming slender transverse series; or, if so, then corium and membrane plainly separated 13

12. (11) Vertex produced in both sexes .... *H. harrisii* (Uhl.) (p. 528)

Vertex not produced in either sex .... *H. vulgaris* (Hungfd.) (p. 530)

13. (11) Clavus rastrate only along hemelytral suture, corium very finely rastrate; pronotum with a median longitudinal pale line on distal half; male structures as on Plate LXXX .... *H. georgiensis* (Egbert) (p. 537)

Clavus rastrate all over; corium not finely rastrate 14

14. (13) Hind femur with a row of about 10 spines ventrally on distal portion of rear margin .... *H. nitida* (Fieb.) (p. 539)

Hind femur with a row of about 6 spines ventrally on distal portion of rear margin 15

15. (14) Short, rather stout species, more than one-third as wide as long; hemelytra heavily rastrate, middle femora stout and spinose ..... *H. martini* (Hungfd.) (p. 542)

Species about one-third as wide as long; not so heavily rastrate; middle femora not stout and spinose 16

16. (15) Corium and membrane plainly separated, often by a pale line; upper distal angle of male pala not acutely, obliquely produced 17

Corium and membrane not plainly separated; upper distal angle of male pala acutely, obliquely produced .... *H. obliqua* (Hungfd.) (p. 543)

17. (16) Interocular space almost equal to the width of an eye; metaxyphus as broad as long; strigil of male not unusually long .... *H. lobata* (Hungfd.) (p. 546)

Interocular space considerably narrower than the width of an eye; metaxyphus longer than broad; strigil of male very long .... *H. interrupta* (Say) (p. 548)

Hesperocorixa minorella (Hungerford)

(Plate LXXX, figs. 7, 7a-7b)

1926. *Arctocorixa minorella* Hungerford, H. B. Bull. Brooklyn Ent. Soc., XXI, p. 197, Pl. XIII, figs. 10, 12 (desc. from Douglas L., Mich.).

1930. *Arctocorixa minorella*, Walley, G. S. Can. Ent. LXII, p. 281 (records Quebec).

1932. *Arctocorixa minorella*, Walley, G. S. Can. Ent. LXIV, p. 153 (records N. shore Gulf St. Lawrence, etc.).

1936. *Arctocorixa minorella*, Walley, G. S. Can. Ent. LXVIII, p. 60 (records Ontario).

1936. *Sigara* (*Anticorixa*) *minorella*, Jaczewski, T. Proc. Royal Ent. Soc. London, V., Pt. 2, Ser. B, p. 48.

Size: Length 6.3 mm. to 7.1 mm. Width of head across eyes 2 mm. to 2.4 mm.

Color: General facies dark. Pronotum with about 7 rather obscured irregular dark bands. Clavus with dark bands regular at base but broken and irregular distally. Corium with pattern in transverse series but broken and irregular throughout; tip of corium pale. Membrane smoky brown with suffused pale markings. Embolium smoky black in darker specimens. Venter black in dark males. Limbs yellow to smoky black; head yellow.

Structural characteristics: Head about half the length of pronotal disk; vertex rounded; facial hairs few; male fovea shallow, not attaining eyes laterally. Antennal segmentation: 1 : 2 : 3 : 4 :: 21 : 15 : 39 : 30 ♂ ; 1 : 2 : 3 : 4 :: 21 : 15 : 40 : 32 ♀ Pronotal disk with median carina showing faintly on anterior margin; somewhat pointed at apex. Pronotum and hemelytra strongly rastrate, membrane shining. A few long, pale hairs on hemelytra. Lateral lobe of prothorax considerably longer than broad, quadrate, anterior apical angle slightly produced. Mesoepimeron rather broad, but with osteole of scent gland nearer to tip than to lateral emargination. Mesosternum slightly medianly produced behind, but not bidentate. Metaxyphus considerably longer than broad.

Front leg of male: pala with sides nearly parallel, apex bluntly rounded, with 22 to 24 teeth, somewhat crowded distally, basal carina not prominent; tibia with short dorsal carina bearing tuft of about 4 spines distally; femur slender, with patch of about 7 rows of stridulatory pegs on inner surface near center. Middle and hind legs slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 41.3 : 33.4 : 33.4. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 87.5 : 112.5 : 35. Male asymmetry dextral. Strigil of moderate size, subovate, of about 7 regular combs. Right clasper of male genital capsule enlarged at tip as in Plate LXXX, fig. 7. Male pala and abdomen as in Plate LXXX, figs. 7a and 7b. Flaps of penial sheath large and of irregular shape.

Comparative notes: This species can be distinguished from other *Hesperocorixa* by the long, slender prothoracic lobe and the long, slender metaxyphus.

Location of types: Described from 20 specimens from Bryant's Bog and Mud Lake, Douglas Lake region, Michigan. Holotype, allotype and paratypes in Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate LXXXIII.) Published records are Michigan in U. S. A. and Quebec and Ontario, Canada. We have before us the following:

CANADA: *Newfoundland:* Lewisport, July-August, 1905, L. P. Gratacap (A. M. N. H.), 1 female.

Ontario: Cranberry Creek, Algonquin Park, April 1, 1936, R. D. C. Martin, 2 males, 1 female (record by G. S. Walley); Ottawa, July 26, 1913, J. I. Beaulne; Trenton, at light, July 19, 1901, Evans (Can. Coll.); Thunder Bay Beach, July 29, 1939, H. S. Parish (Lutz); same place and collector, Aug. 9, 1940 (Lutz); same place and collector, July 9, 1941 (Lutz).

Manitoba: Winnepeg, June 12, 1910, J. B. Wallis (Wallis Coll.), 2 males.

U. S. A.: *Maine:* Peak's Island, July 31, 1937, G. A. Moore; same place and collector, Aug. 8, 1937; same place and collector, Aug. 27, 1937.

New Hampshire: Hampton, April 18, 1922, S. Albert Shaw, 1 male, 1 female.

Connecticut: Cockaponsett, St. Forest, G. E. Pickford (Hutchinson Coll., Yale); Pachang, July 19, 1942, G. E. Pickford (Hutchinson Coll., Yale).

Michigan: Douglas Lake, Bryant's Bog, Aug. 17, 1923, H. B. Hungerford, 2 males, 3 females; same place and collector, Aug. 12, 1925, 12 males, 12 females; same place and collector, July 24, 1925, 5 males, 7 females; same place and collector, July 17, 1923, 2 males, 3 females; same place and collector, July 29, 1923, 3 males, 2 females; same place and collector, Aug. 1, 1923, 9 males, 6 females; same place and collector, July 11, 1930, 3 males, 3 females; Douglas Lake, Vincent Lake, July 23, 1923, H. B. Hungerford, 1 female; Douglas Lake, Bessey Creek, July 18, 1923, H. B. Hungerford, 1 female; Douglas Lake, Trout Creek, Aug. 9, 1923, H. B. Hungerford, 1 male, 4 females; Douglas Lake, Smith's Bog, June 11, 1923, H. B. Hungerford, 3 males, 10 females; Mud Lake, July 31, 1923, H. B. Hungerford, 4 males, 14 females; North Michigan, Aug. 23, 1930, H. B. Hungerford, 1 female; Cheboygan Co., July 5, 1918, R. F. Hussey (Hussey Coll.), 8 males, 4 females; Charlevoix Co., Beaver Island, Sept. 6, 1922, R. F. Hussey (Hussey Coll.), 1 male.

Wisconsin: Brule, Aug. 16, 1937, C. L. Johnston, 1 male; Wisconsin (C. F. Baker in U. S. N. M.).

Minnesota: Two Harbors.' Aug. 9, 1922, H. B. Hungerford, 1 male, 3 females; Carlson, Aug. 8, 1922, H. B. Hungerford, 4 males, 1 female; Itasca Park, Aug. 21, 1922, H. B. Hungerford, 4 males, 8 females; Lake Isabella River, Aug. 14, 1922, H. B. Hungerford, 1 female; Minneapolis, Univ. campus pool, Aug. 17, 1921, Hoffmann (Minn. Coll.), 1 male, 1 female.

Kansas: Riley Co., from student collection, 1 male, 1 female.

Hesperocorixa atopodonta (Hungerford)

(Plate LXXX, figs. 2, 2a-2b)

1916. *Arctocorisa dubia* Abbott, J. F. Ent. News, XXVII, p. 342.

1917. *Arctocorisa dubia,* Parshley, H M. Occ. Papers of Boston Soc. of Nat. Hist., VII, p. 117.

1926. *Arctocorixa dubia,* Blatchley, W. S. Heteroptera of Eastern North America, pp. 1069, 1072.

1927. *Arctocorixa atopodonta* Hungerford, H. B. Bull. Brooklyn Ent. Soc., XXII, p. 35. (New name for *A. dubia* Abbott with additional descriptive note and distribution record.)

1928. *Arctocorixa dubia,* Torre-Bueno, J R. de la A List of the Insects of New York, Cornell U. Agri. Exp. Sta. Memoir 101, p. 141.

1929. *Sigara (Anticorixa) atopodonta,* Lundblad, O Entomologisk Tidskrift, L, Häft 1, pp. 29-33, figs. 8, 9a-k, Taf. III, fig. 4.

1930. *Arctocorixa atopodonta,* Walley, G S. Can. Ent., LXII, p 280.

1932. *Arctocorixa atopodonta,* Ricker, Wm. E. Univ. of Toronto Press Biol. Series No. 36, p. 88 (in stomach of speckled trout).

1936. *Sigara (Anticorixa) atopodonta,* Jaczewski, T. Proc. Roy. Ent. Soc. Lond., B, Vol. 5, Pt. 2, p. 43

1936. *Arctocorixa atopodonta,* Walley, G. S. Can. Ent., Vol. LXVIII, p. 60.

1938. *Arctocorixa dubia,* Brimley, C. S. Insects of North Carolina, p. 84.

Size: Length from 8.3 mm. to 9.6 mm. Width of head across eyes from 2.6 mm. to 2.9 mm.

Color: General facies chestnut brown. Pronotum crossed by 8 to 9 rather broad lines, usually straight and unbroken. Lines of clavus, corium and membrane uniformly coalescent to form a dark background with narrow flecks of light straw color. Posterior angle of corium conspicuously bordered by V-shaped yellow band which separates corium from membrane. Embolium yellowish white. Limbs and venter straw yellow.

Structural characteristics: Head slightly less than half the length of pronotal disk, facial hairs few, vertex not produced. Male fovea very shallow, not reaching middle of eyes. Antennal segments: 1 : 2 : 3 : 4 :: 28 : 22 : 52 : 34 ♂; 1 : 2 : 3 : 4 :: 30 : 21 : 60 : 38 ♀. Pronotum slightly pointed at apex; carina very short, hardly noticeable; strongly rastrate. Hemelytra rastrate, with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow about one-third the length of the embolium. Lateral lobe of prothorax quadrate, slightly rounded at apex. Mesoepimeron moderately broad; scent gland osteole about half way between tip and lateral emargination; mesosternum not medianly produced behind. Metaxyphus arrow-shaped; no longer than broad.

Front leg of male: pala oblong, cultrate; pegs about 27, crowded toward distal end, and with one larger peg standing out of line, apart from rest, at distal end of row; basal carina large, prominent; tibia with pronounced dorsal carina bearing stout spine at distal end; femur rather stout, oblong, with no stridulatory pegs at base. Middle and hind legs slender, the relation of segment to segment being as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 42.7 : 32.9 : 32.9; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 94 : 120 : 40. Male asymmetry dextral; strigil of moderate size, longer than broad, composed of six regular combs. For details of male structures see Plate LXXX, figs. 2, 2a, and 2b.

Comparative notes: The peg which stands away from the rest on the male pala readily distinguishes this species from all other *Hesperocorixa* except the European *H. parallela* (Fieber).

Location of type: Described from one male holotype from Peru, Mass., in the Parshley collection. This specimen, labeled "Peru, Mass., VIII-27-1904" and "Holotype *Arctocorixa dubia* Abbott", is, through the kindness of Doctor H. M. Parshley, now in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate LXXXIV.) The published records are: Massachusetts, Maine, New York, Minnesota, Michigan, Kansas, Colorado, and Ontario, Canada. We have studied the following:

CANADA: *Nova Scotia:* Truro, August, 1913, R. Matheson (Cornell), 2 males, 6 females.

Ontario: Toronto, March 21, 1931, E. C. Oakley (Lutz); Guelph, August 3, 1931, W. H. G. Patton (H. G. Barber), 1 male, 1 female; Ottawa, July 28, 1913, J. I. Beaulne; Ottawa, W. Simpson; Trenton, at light, Evans; Thunder Bay Beach, July 9, 1941, H. S. Parish.

Manitoba: Cowan, March 7, 1937, C. L. Johnston, 1 female; Red Deer R., August 3, 1937, R. H. Beamer, 1 female.

U. S. A.: *Maine:* Peak's Isld., August 7, 1937; Orono, May 1, 1912, H. M. Parshley, 2 males.

New Hampshire: Durham, October 2, 1901, Osborne, 1 male, 2 females; Hampton, April 18, 1922, S. Albert Shaw.

Massachusetts: Milton, March 26, 1922, W. Clench, 5 males, 2 females; Peru, August 27, 1904 (Parshley Coll.) 2 males; Washington, August 8, 1912 (Parshley); Melrose High, April 1. D. H. Clemons, 1 male; Northampton, September 31, 1917, H. M. Parshley, 3 males, 6 females; same place, September 19, 1919, Priscilla Butler, 3 males, 6 females; Peru, August 24, 1904, 2 males; Forest Hills, May 4, 1915 (Parshley).

Connecticut: Windham Co., Aug. 11, 1927, C. L. Hubbs (Mich. Coll.), 1 male, 2 females; New Haven, June 27, 1911, A. B. Champlain, 3 females; same place, Aug. 22, 1913, B. H. Walden (Parshley); Hartford, April 14, 1914, 1 male; Natchang, St. Forest, Aug. 21, 1942. G. E. Pickford (Hutchinson).

Rhode Island: Providence, Sept. 3, Davis (Parshley).

New Jersey: Ramsey, July 7, 1912, 2 males, 3 females; Passiac Co., Aug. 19, 1927, Hubbs and Breder (Mich. Coll.), 1 female.

New York: Ithaca, P. W. Claassen, 1 male, 1 female; Ithaca, H. B. Hungerford, 1 male; Ithaca, Aug. 26, 1891, 1 female; Ithaca, Sept. 15, 1917, E. C. Van Dyke (Calif. Acad.).

Pennsylvania: Barrens, Aug. 5, 1942, V. R. Haber, 4 males, 6 females; Pine Grove Mills, July 22, 1942, V. R. Haber, 1 male.

Ohio: Delaware, June 26, 1916, C. J. Drake (Drake)

Michigan: Berrien Co., 1 male, 3 females; Cheboygan Co., Aug. 19, 1918, R. H. Hussey, 4 males; same place, Douglas Lake, July 17, 1936, C. D. Lyman (Mich. Coll.), 1 male, 2 females; Douglas Lake, Trout Creek, Aug. 9, 1923, H. B. Hungerford, 1 female; Douglas Lake, Smith's Bog, June 11, 1923, H. B. Hungerford, 1 male, 1 female; same place and collector, July 19, 1929, 2 males, 1 female; same place and collector, June 11, 1924, 40 males, 35 females; Douglas Lake, July 23, 1924, H. B. Hungerford, 19 males, 17 females; Douglas Lake, July 17, 1924, H. B. Hungerford, 1 male; Cheboygan Co., Aug. 7, 1930, H. B. Hungerford, 1 male; East Fish Tail Pool, Doug. L., July 6, 1923, H. B. Hungerford, 1 male; Mud Lake, Doug. L., July 31, 1923, H. B. Hungerford, 2 males; Sedge Point Pool, Doug. L., July 17, 1923, H. B. Hungerford, 3 females; same place and collector, June 30, 1923, 1 female; Bryant's Bog, Douglas L., July 12, 1924, H. B. Hungerford, 1 female; Burt Lake, July 7, 1923, H. B. Hungerford, 3 males, 2 females; Bois Blanc Island, Aug. 11, 1932, H. B. Hungerford, 1 male, 1 female; Washtenaw Co., April 19, 1919, R. H. Hussey, 4 males, 2 females; same place, April 25, 1933 (Mich. Coll.), 1 male, 1 female; same place, Ann Arbor, 1918, F. M. Gaige (Mich. Coll.), 4 males, 7 females; Ann Arbor, Miss Haynes (Mich. Coll.), 2 males, 7 females; same place, June, 1921, R. H. Hussey, 5 males, 2 females; Battle Creek, Aug. 23, 1920, Priscilla Butler, 1 male; same place, Sept. 22, 1920, Priscilla Butler (Hussey Coll.), 3 males, 9 females; Livingston Co., Aug. 10, 1919, R. H. Hussey, 1 male; Pentwater, July 17, 1916, E. Liljeblad (Field Mus. Coll.), 2 males, 2 females; Huron Mt. Club, L. Superior, June, 1911 (Barber Coll.), 1 female; Muskegon Drain, Mecosta Co., May 10, 1925, J. Metzelaar, 1 female (Mich.); Taquamenun R., Luce Co., May 20, 1925, J. Metzelaar, 1 female (Mich.); Leighton Swamp, Allegan Co., March 10, 1925, J. Metzelaar (Mich.), 1 female.

Wisconsin: Polk Co., Avery, Sept. 19, 1928, E. P. Creaser (Mich. Coll.), 1 female; Rush Co., Sept. 1, 1930, Creaser and Jones (Mich. Coll.), 1 female; Rayfield Co., Aug. 2, 1928, Creaser and Jones (Mich. Coll.), 2 females; Wisconsin, C. F. Baker (U. S. N. M.), 1 female; Wisconsin (K. U. Coll.), 2 males, 1 female; Dane Co., Lake Wingra, March 16, 1930, E. P. Breakey, 6 males, 7 females; Brule, Aug. 16, 1937, R. H. Beamer, 1 male; same place and date, C. L. Johnston, 1 female; Sauk Co., Baraboo R., Aug. 31, 1927, Creaser, Stewart and Griffith (Mich.), 2 females; St. Croix R., Aug. 17, 1928, Schultz and Tarzwell (Mich.), 3 females; Fond du Lac, Grand River, Fairwater, Aug. 28, 1925, Greene and Jones (Mich.), 1 male, 1 female.

Minnesota: Minneapolis, April 20, 1927, R. A. Vickery (U. S. N. M.), 4 females; same place, 1919, R. H. Hussey (Hussey), 2 males; St. Paul, June 29, 1931, A. A. Granovsky, 1 female; St. Louis Co., Aug. 14, 1922, H. B. Hungerford, 2 females; Grand Marais, Aug. 13, 1922, H. B. Hungerford, 1 female; Becker Co., Aug. 22, 1922, H. B. Hungerford, 1 male, 1 female; L. Isabella R., Aug. 18, 1922, H. B. Hungerford, 1 male; Carlson, Aug. 8, 1922, H. B. Hungerford, 1 male, 2 females; Cooley, Aug. 13, 1937, H. T. Peters, 1 male; Eveleth, Aug. 13, 1937, C. L. Johnston, 1 male; Hibbing, Aug. 18, 1922, H. B. Hungerford, 1 female; Minnesota, H. B. Hungerford, 2 males, 7 females; Olivia, June 28, 1921, H. H. Knight (Minn.), 21 males, 17 females; St. Paul, June 25, 1921, W. E. Hoffmann (Minn.), 1 male, 2 females.

North Dakota: Hillsboro, July 26, 1937, R. H. Beamer, 1 male.

Colorado: Pingree Park, Aug. 20, 1924, Beamer and Lawson, 25 males, 113 females.

Montana: Three Forks, July 22, 1931, L. D. Anderson, 1 male.

Washington: Yelm, Thurston Co., permanent pond, Jan. 15, 1947, E. P. Breakey and son, 1 male.

Hesperocorixa michiganensis (Hungerford)

(Plate LXXX, figs 6, 6a-6b)

1926 *Arctocorixa michiganensis* Hungerford, H. B Bull Brooklyn Ent. Soc, XXI, pp. 197-198, Pl XIII, fig 15 (desc from Mich.).

1930 *Arctocorixa michiganensis*, Walley, G S. Can Ent LXII, p 281 (records Quebec, Canada).

1936 *Arctocorixa michiganensis*, Walley, G. S. Can. Ent. LXVIII, p. 60 (records British Columbia, Canada).

1936. *Sigara* (*Anticorixa*) *michiganensis*, Jaczewski, T Proc. Royal Ent. Soc. London, V., Pt. 2, Ser. B, p. 48.

Size: Length 6.3 mm. to 7.2 mm. Width of head across eyes 2.1 mm. to 2.3 mm.

Color: General facies medium brown. Pronotum with about 7 dark bands of which posterior ones are somewhat broken and irregular. Dark markings of clavus and corium wavy and irregular in appearance. Membrane smoky-brown, covered with irregular pale blotches; separation from corium indistinctly marked by pale brown line. Limbs and thorax yellow, abdominal venter brownish. Embolium silvery-white.

Structural characteristics: Head about half as long as pronotal disk, vertex rounded; facial hairs few; male fovea very shallow, not attaining eyes laterally. Antennal segmentation as follows: 1 : 2 : 3 : 4 :: 24 : 16 : 48 : 31 males; 1 : 2 : 3 : 4 :: 24 : 15 : 45 : 32 females. Pronotum with faint indication of median carina on anterior margin; apex somewhat pointed. Pronotum and hemelytra strongly rastrate, membrane shining. Hemelytra with numerous whitish hairs, especially on membrane. Lateral lobe of prothorax about half as broad as long and with anterior apical angle produced. Mesoepimeron broad, osteole located almost at lateral emargination. Metaxyphus as broad as long, arrow-shaped.

Front leg of male: Pala rather short with sides nearly parallel, the apex bluntly rounded, peg row with about 22 teeth, basal carina prominent; tibia with short dorsal carina bearing tuft of 3 to 4 long spines distally. Femur moderately slender, without stridulatory pegs on inner surface. Middle and hind legs slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 36.6 : 28.6 : 38.2. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.2 : 115.2 : 43.5. Male asymmetry dextral. Strigil long and slender, with 5 somewhat irregular combs. For details of male structures see Plate LXXX, figs. 6, 6a and 6b.

Comparative notes: This species can be distinguished by the anterior apical angle of the prothoracic lobe being somewhat produced, by the broad mesoepimeron with the scent gland osteole near the lateral emargination, and by the broad rounded cap-like head fitting closely over a short rounded pronotum.

Location of types: Holotype, allotype and some paratypes from the Douglas Lake, Michigan, region in the Francis Huntington Snow Collections, University of Kansas. Other paratypes in the Museum of Zoölogy, University of Michigan, Ann Arbor, Michigan.

Data on distribution: (Plate LXXXIII.) The published records are Michigan, U. S. A., and Quebec and British Columbia, Canada. We have before us the following:

CANADA: *Manitoba:* Red Deer R., Aug. 3, 1937, C. L. Johnston, 10 males, 6 females; Oakner, July 31, 1937, C. L. Johnston, 2 males; Cowan, Aug. 7, 1937, C. L. Johnston, 1 male; Miami, June 27, 1916, J. B. Wallis (Wallis), 1 female.

Ontario: Merivale, April 16, 1931, G. S. Walley (record by Walley).

U. S. A.: *New Hampshire:* Hermit Lake (Kirkaldy Coll.), 2 males, 2 females.

Massachusetts: Forest Hills, Oct. 21, 1921, R. F. Hussey (Hussey Coll.), 1 female.

New York: White Plains, Aug. 29, 1908, 1 male.

Michigan: Chippewa Co., Whitefish Point, Aug. 27, 1913, T. L. Hankinson (Mich. Coll.), 1 male; Cheboygan, Aug. 15, 1928, Wesley Clanton (Mich. Coll.), 1 female; Cheboygan Co., July 9, 1918, R. F. Hussey (Hussey Coll.), 2 males, 9 females; Cheboygan Co., Aug. 7, 1930, H. B. Hungerford, 2 females; North Michigan, Aug. 23, 1930, H. B. Hungerford, 4 females; Topinabee (Cornell U. Coll.), 1 male, 4 females; Douglas Lake, 1 female; same place, July 10, 1927, H. B. Hungerford, 14 males, 18 females; same place and collector; Sedge Pool, June 30, 1923, H. B. Hungerford, 1 male; same place and collector, July 3, 1923, 1 female; same place and collector, July 13, 1923, 5 males, 2 females; same place and collector, July 17, 1923, 2 males, 1 female; same place and collector, Aug. 15, 1923, 42 males, 93 females; Douglas Lake, Bryant's Bog, July 17, 1923, H. B. Hungerford, 8 males, 5 females; same place and collector, Aug. 17, 1923, 3 males, 4 females; Douglas Lake, East Fish Tail Pool, July 6, 1923, H. B. Hungerford, 7 females; Douglas Lake, Smith's Bog, July 16, 1923, H. B. Hungerford, 2 males, 2 females; same place and collector, July 19, 1929, 6 males, 11 females; Douglas Lake, Bessey Creek, July 18, 1923, H. B. Hungerford, 1 female; Burt

Lake, July 7, 1923, H. B. Hungerford, 12 females; Burt Lake, Fontenalis Run, July 7, 1923, H. B. Hungerford, 1 female; Cheboygan Co., July 29, 1918, P. Butler, 4 males, 3 females; Cheboygan Co., July 29, 1918, R. F. Hussey (Hussey Coll.), 6 males, 2 females; Montgomery Co., July, 1925, J. Metzelaar (Mich. Coll.), 1 male; Washtenaw Co., 1918, R. F. Hussey (Hussey Coll.), 2 females.

Wisconsin: Brule, Aug. 16, 1937, C. L. Johnston, 3 males, 7 females; Wisconsin, C. F. Baker, 2 females; Dane Co., April 19, 1930, E. P. Breakey, 1 male, 3 females.

Minnesota: St. Paul, Oct. 8, 1918, R. F. Hussey (Hussey Coll.), 2 females; St. Paul, Elk's Golf Pond, June 5, 1921, Hoffmann (Minn. Coll.), 1 male; Hibbing, Aug. 18, 1922, H. B. Hungerford, 1 female; Cook Co., Beaver Dam, Aug. 12, 1922, H. B. Hungerford, 1 male, 2 females; Pine River, Big Trout Lake, Aug. 22, 1939, H. C. Severin (S. D. Coll.); same place and collector, Aug. 28, 1942, 3 males, 4 females.

North Dakota: McVille, July 27, 1937, C. L. Johnston, 1 male; Turtle Mts., Aug. 3, 1920, T. H. Hubbell (Hubbell Coll.), 1 female.

South Dakota: Weta, July 18, 1937, C. L. Johnston, 2 males, 1 female.

Hesperocorixa semilucida (Walley)

(Plate LXXIX, figs. 1, 1a-1c)

1930. ***Arctocorixa semilucida*** **Walley, G. S. Can. Ent., LXII, p. 284-285. Plate 21, figs. 3a, 3b, 3c, 3d.**

1936. ***Sigara (Anticorixa) semilucida*****, Jaczewski, T. Proc. Royal Ent. Soc. London, Ser. B, V, Pt. 2, p. 43.**

Size: Length 7 mm. to 7.5 mm. Width across eyes 2.35 mm. to 2.44 mm.

Color: General facies dark, often suffused with red. Pronotum crossed by 7 to 9 brown bands. Background color varying from yellow to red on pronotum and hemelytra. Clavus and corium with brown pattern arranged in more or less longitudinal series. Membrane with obscure brown marks. Color pattern etched away along margins of clavus and corium. Embolium yellowish white. Head and limbs yellowish, the latter often suffused with red. Abdominal venter black with yellow to orange margins. Thorax yellow.

Structural characteristics: Head slightly shorter than pronotal disk as seen from above; vertex not produced. Facial hairs few; male fovea shallow. Antennal segmentation: 1 : 2 : 3 : 4 :: 28 : 18 : 58 : 31 males; 1 : 2 : 3 : 4 :: 28 : 19 : 55 : 29 females. Pronotal disk about twice as wide as long, rounded apically, with faint median carina visible on anterior fourth, faintly rastrate. Hemelytra moderately rastrate, a few pale hairs on corium and membrane. Lateral lobe of prothorax obliquely truncate, the anterior apical angle slightly produced. Mesoepimeron broad with osteole remote from tip. Pleural region laterally inflated. Metaxyphus slender and pointed, considerably longer than wide.

Front leg of male: Pala subparallel-sided, the apex blunt, about 20 to 22 pegs, basal carina distinct. Tibia with short dorsal carina bearing tuft of about 3 hairs apically. Femur slender; no stridulatory pegs. Middle leg: femur : tibia : tarsus : claw :: 100 : 40 : 30 : 30. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 87.5 : 112.5 : 42.5. Male asymmetry dextral. Strigil oval, of about 5 regular combs. Tip of ninth segment of male without fluted edge. For details of male abdomen and genitalia see Plate LXXIX, figs. 1 and 1b. Flaps of penial sheath large.

Comparative notes: This species differs from *H. brimleyi* Kirk. and *H. kennicottii* (Uhler) in having a long, slender metaxyphus.

Location of types: No. 3128 in the Canadian National Collection, Ottawa. Holotype male, Point Pelce, Ont., June 6, 1929 (Walley). Allotype, same data, and ten paratypes, females, same place, June 3-6, 1929 (Milne and Walley). One of these paratypes now in the Francis Huntington Snow Collections at the University of Kansas.

Data on distribution: (Plate LXXXV.)

CANADA: *Ontario:* Point Pelee, June 6, 1929, Walley and Milne, type series; Prince Edw. Co., April 20, 1930, Brimley, 1 male (recorded by G. S. Walley).

U. S. A.: *Massachusetts:* Northampton, Oct. 31, 1917, H. M. Parshley (Parshley Coll.), 2 males; Saugus, Aug. 2, 1917, H. M. Parshley (Parshley Coll.), 1 male; Massachusetts (Uhler Coll.), 1 male; Massachusetts, F. Blanchard, 1 male; Massachusetts (Uhler), 1 female; Wellesley, A. P. Moore, 1 male, 1 female.

New York: Staten Island (Wash. U. Coll.), 1 male; Syracuse, Oct. 3, 1 male.

New Jersey: Lakeway, Aug., 1920, J. W. Angell, 1 female; Great Piece, May 2, 4 males, 1 female; Milburn, April 30, 1 male; Paterson, June, 1923, 1 female; Trenton, Oct. 3, 2 males, 1 female.

Delaware: Lewis, 1913, H. W. Fowler, 2 females.

North Carolina: Raleigh, January, 2 males; Raleigh, April 12, 1906, C. S. Brimley (Brimley Coll.), 1 male; Raleigh, January, 1 male.

Florida: Agricultural Exp. Sta., Gainesville (Fla. Ag. Exp. Sta. Coll.), 1 female.

Louisiana: C. F. Baker (Baker Coll.), 1 male, 1 female.

Tennessee: Obion Co., Reelfoot Lake, June 24, 1931, Creaser and Delavan (Mich.), 4 males, 16 females.

Illinois: Illinois (Uhler), 1 male.

Michigan: Washtenaw Co., May 14, 1933, 1 male, 1 female; Washtenaw Co., Ann Arbor, Oct. 18, 1916, F. M. Gaige, 2 males, 1 female.

Hesperocorixa brimleyi (Kirkaldy)

(Plate VII, Plate LXXIX, figs. 2, 2a-2d)

1908. *Arctocorisa (Hesperocorixa) brimleyi* Kirkaldy, G. W. Can. Ent. XL, p. 120 (desc. from N. Carolina).

1909 *Arctocorisa brimleyi,* Kirkaldy, G W., and Torre-Bueno, J. R de la. Catalogue in Proc. Ent. Soc. Wash. X, p. 194.

1917. *Arctocorixa (Hesperocorixa) brimleyi,* Van Duzee, E. P Catalogue of Hemiptera of America North of Mexico, p. 485.

1926. *Hesperocorixa brimleyi,* Blatchley, W. S. Heteroptera of Eastern North America, p. 1081.

1928. *Hesperocorixa brimleyi,* Hungerford, H. B Annals Ent. Soc. Amer. XXI, p. 140, Pl. VIII, figs. 1, 3.

1928. *Arctocorixa brimleyi,* Hungerford, H. B. Ent News, XXXIX, p 156 (records from Baker Co., Ga.).

1938. *Hesperocorixa brimleyi,* Brimley, C. S. Insects of North Carolina, p. 84.

1940. *Corixa (Hesperocorixa) brimleyi,* Hutchinson, G. E. Trans. Conn. Acad. Arts and Sci. XXXIII, p. 418.

Size: Length 8.2 mm. to 8.8 mm. Width across eyes 2.4 mm. to 2.9 mm.

Color: General facies reddish orange. Pronotum without cross bandings. Basal third of clavus black, the other two-thirds reddish orange without markings. Corium reddish orange without markings apically, but with diagonal black band beyond claval tip. Distal angle of corium reddish orange, membrane also reddish orange. Embolium smoky. Head and vertex medium to dark brown, beak black, limbs usually suffused with bright red.

Structural characteristics: Head equal to or slightly longer than pronotal disk, vertex conically produced in both sexes. Facial hairs few. Fovea of male very shallow. Antennal segmentation as follows: 1 : 2 : 3 : 4 :: 28 : 20 : 50 : 34 ♂; 1 : 2 : 3 : 4 :: 28 : 22 : 64 : 32 ♀. Pronotal disk about half as long as wide, usually with a very faint median carina on anterior third, apex rounded. Hemelytra and pronotum but slightly rastrate or faintly rugulose. A few pale hairs on hemelytra.

Lateral lobe of prothorax obliquely truncate, the anterior apical angle produced. Mesoepimeron broad with osteole remote from tip. Pleural region laterally inflated. Metaxyphus pointed, no longer than broad. Front leg of male: pala subparallel-sided, long, about 28 palar pegs. Basal carina, if present, indistinct. See fig. 2, Plate LXXIX. Pala not longitudinally carinate on outer surface, appearing thin in dorsal view. Tibia with dorsal ridge, bearing a spiniform tuft of about 5 hairs distally. Femur moderately broad, without stridulatory pegs on inner basal surface. Middle and hind legs slender, the relation of segment to segment as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 35.5 : 28.9 : 33.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 90 : 122 : 44. Male asymmetry dextral. Strigil suboval, of about 5 fairly regular combs. The tip of the ninth segment or the male genital capsule with a fluted edge. For details of male abdomen and genitalia see Plate LXXIX, figs. 2 and 2b. Flaps of penial sheath large.

Comparative notes: This species differs from *H. semilucida* (Walley) in having a short, blunt metaxyphus and from *H. kennicottii* Kirk. in being orange or red with a large black spot on the base of the clavus and on the distal portion of the corium. Other differences are structural; its first tarsal segment of hind leg is broader, the strigil smaller and the tip of the ninth segment (genital capsule) of different shape. The pala is not thickened as seen in dorsal view.

Location of types: A series of eight specimens, 3 males, 5 females, were located by me in the remnants of the Kirkaldy collection and are now in the Francis Huntington Snow Collection of the University of Kansas. One specimen was labeled Raleigh, North Carolina, and two were labeled by Kirkaldy *Hesperocorixa brimleyi.* I have selected a male as a lectoholotype and a female as a lectoallotype. The others I have labeled cotypes.

Data on distribution: (Plate LXXXV.) *New Jersey:* Iona, July 7, 1938, J. C. Lutz (Lutz Coll.), 1 male, 2 females.

North Carolina: Raleigh, Jan., 1905, C. S. Brimley, 2 males, 3 females.

Georgia: Baker Co., Oct. 23, 1927, C. H. Martin, 1 male, 1 female; Okefenokee Swamp, Aug. 3, 1934, A. P. McKinstry, 20 males, 13 females; Tomb's Co., 7 mi. so of Lyons, Sept. 7, 1929, E. Creaser (Mich. Coll.), 1 female.

Alabama: Palmer Pond, March 13, 1939, R. Christenson.

Hesperocorixa kennicottii (Uhler)

(Plate LXXIX, figs. 8, 8a-8d)

1897. *Corixa kennicottii* Uhler, P. R. Trans. Maryland Acad. Sci. (Baltimore) I, p. 393-394 (in coastal region and vicinity of Chicago).

1909. *Arctocorisa kennicottii*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 195.

1914. *Corixa kennicottii*, Parshley, H. M. Psyche XXI, p. 140 (record from Maine).

1917. *Arctocorixa kennicottii*, Van Duzee, E. P. Catalogue of Hemiptera of Amer. North of Mex., p. 481.

1917. *Arctocorisa kennicotti*, Parshley, H. M. Occasional Papers of the Boston Soc. of Nat. Hist., VII, p. 117.

1923. *Arctocorisa kennicottii*, Abbott, J. F., *in* Guide to the Insects of Connecticut, Pt. IV, The Hemiptera or Sucking Insects of Connecticut, pp. 387-389, fig. 36 (2) and (7).

1926. *Arctocorixa kennicottii*, Blatchley, W. S. Heteroptera of Eastern North America, pp. 1069-1072, figs. 2 and 7.

1928. *Arctocorixa kennicottii*, Hungerford, H. B. Annals Ent. Soc. Amer XXI, p 140, Pl. VIII, figs. 2, 4 and 6 (belongs under *Hesperocorixa*).

1928. *Arctocorixa kennicottii*, Torre-Bueno, J R. de la, *in* Cornell Univ. Agri Exp Sta. Memoir 101, A list of the Insects of New York, p. 141.

1930. *Arctocorixa kennicottii*, Walley, G S Can Ent. LXII, p. 280 (records from Ontario and Quebec, Canada).

1936 *Sigara (Anticorixa) kennicottii*, Jaczewski, T. Proc. Royal Ent. Soc London, Ser. B, V, Pt. 2, p 42.

1940 *Corixa (Hesperocorixa) kennicottii*, Hutchinson, G. E Trans. Conn. Acad. Arts and Sci., XXXIII, p. 413, figs. 397-405.

1943. *Hesperocorixa kennicottii*, Walton, G. A. Trans. Soc. for British Entomology VIII, Pt. 5, p. 161 (Places in *Corixa*).

1946. *Arctocorixa kennicottii*, Proctor, Wm. Biol. Sur of Mt. Desert Region Inc., Pt. VII, the Insect Fauna, p. 83 (records estuary of Gt. Heath, Mount Desert Isl.).

Size: Length 8 mm. to 8.8 mm. Width across eyes 2.5 mm. to 2.8 mm.

Color: Pattern variable. Pronotum may be crossed by seven or eight brown bands or it may be golden brown without crossbands or with faint ones. The clavus may have wavy dark markings interspersed with yellow or the dark figures may be completely coalescent into a solid black field, margins of clavus yellow or golden brown. Corium may have the dark figures in more or less regular transverse series or the figures may be fused into a solid black field, the margins yellow or golden brown. Embolium and membrane pale yellow to golden brown. Head, limbs and thorax yellow to golden brown, hind legs sometimes suffused with red. Abdominal venter black with yellow to golden brown margins.

Structural characteristics: Head as long as pronotal disk, eyes rounded, vertex produced in both sexes. Facial hairs few. Face of male flattened but without or with a very faint impression. Antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 20 : 50 : 30 ♂; 1 : 2 : 3 : 4 :: 23 : 20 : 50 : 31 ♀. In many specimens the first and third antennal segments are relatively longer. Pronotal disk about half as long as wide, with faint indication of median carina on anterior fourth, faintly rastrate, rounded at apex. Hemelytra rastrate, with a few pale hairs, especially on membrane. Lateral lobe of prothorax obliquely truncate, the anterior apical angle slightly produced. Mesoepimeron broad with osteole remote from tip. Thorax laterally inflated. Metaxyphus as broad as long, apex pointed. Front leg of male: pala subparallel-sided, rounded apically, with about 28 palar pegs. Pala longitudinally carinate on outer surface, appearing thickened as seen in dorsal view. A faint carina visible dorsally at the base. Tibia with a short dorsal ridge bearing a tuft of about 3 hairs apically. Femur not stout and without stridulatory pegs on inner basal surface. Middle and hind legs long and slender, the relation of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 36 : 32.6 : 36. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92 : 110 : 40. Male asymmetry dextral. Strigil suboval, of about 8 fairly regular combs. Tip of ninth segment of male (genital capsule) with a fluted edge. For details of male abdomen and genitalia see Plate LXXIX, figs. 3 and 3b. Flaps of penial sheath large.

Comparative notes: This species differs from *H. brimleyi* in color pattern and certain structural characters and from *H. semilucida* in having the metaxyphus no longer than broad.

Location of types: Four specimens in the Uhler Collection at the U. S. National Museum: 3 males from "Pennamaquan R., Me. June 10, 1893 W. C. Kendall, collector." 1 male "Mass." P. R. Uhler collection, which lacks the pronotal lines and has the solid black fields on clavus and corium as is the case of one of the Maine specimens. I have selected one of the Maine specimens as lectoholotype and a female from Cambridge, Mass., as the allotype with the following as parallotypes: 1 female, Cambridge, Mass.; 2 females, Holderness, N. H.; 2 females, Hamden, Ct. All of these females are associated with males.

Data on distribution: (Plate LXXXV.)

U. S. A.: *Maine:* Orono, April 21, 1900 (Uhler det.); Mount Desert Island, Sept. 1, 1942, W. Proctor, 1 male, 3 females; Pennamaquan River, June 10, 1893, W. C. Kendall, 2 males, 1 female.

New Hampshire: Holderness, Aug. 3, 1889, 1 male, 2 females; Hampton, April 23, 1922, S. Albert Shaw; Durham.

Massachusetts: Cambridge, 3 males, 2 females; Massachusetts (Parshley Coll.), 1 male; Northampton, Oct. 9, 1920, Louise Smith, 1 male, 1 female.

Connecticut: Hamden, June 1, 1911, B. H. Walden (Parshley) (these labeled "paratype, *A. lucida* Abbott").

New York: Ithaca, Aug. 9, 1894, 3 males, 2 females; same place, July 17, 1917, H. B. Hungerford, 1 male, 4 females; Calverton, L. I., May 27, 1923, Roy Latham, 1 female; Van Cortlandt Park, April 18, 1903 (Wash. U Coll), 4 males, 5 females; Van Cortlandt Park (Hussey), 2 females; Montauk, L. I., June 7, 1931, Roy Latham, 1 male.

New Jersey: Iona, July 22, 1941, J. C. Lutz (Lutz Coll.), 2 males, 1 female; Iona, July 7, 1938, J. C. Lutz (Lutz Coll.), 1 male, 3 females; Trenton, Oct 3 (Bueno Coll), 2 males, 1 female; Riverton. Aug. 17, 1902, Van Duzee (Van Duzee); Trenton (Hussey), 4 females.

Maryland: Crapo, May 20, 1916 (Lutz).

Washington, D. C.: May 11, 1890, 1 male, 1 female.

Virginia: Norfolk, May 11, 1928, G. E. Gould, 3 females.

Ohio: Ira, Summit Co., Aug. 31, 1916, C. J. Drake (Drake).

Michigan: Nigger Creek, Mullett L. Michigan, July 30, 1925, H. B. Hungerford, 1 male; Cheboygan Co., Aug 2, 1934, H. B. Hungerford, 3 females; Douglas Lake, 1927, H. B. Hungerford, 1 female; Douglas Lake, 1924, H. B. Hungerford, 1 male, 1 female; Washtenaw Co , Ann Arbor, Oct. 18, 1916, F. M. Gaige (Mich Coll), 2 males, 1 female; Michigan (Uhler Coll.), 1 female

Illinois: Algonquin, May 30, 1908, Nason, 1 male.

Wisconsin: Brule, Aug. 16, 1937, C. L. Johnston, 1 male, Dane Co , May 24, 1914, Wm. S. Marshall, 1 female; Dane Co , March 16, 1930, E. P. Breakey, 44 males, 74 females.

Minnesota: Pelican Rapids, Aug. 22, 1922, H B. Hungerford, 1 male; Shell L., Becker Co , Aug. 22, 1922, H. B. Hungerford, 1 male.

CANADA: Toronto, Ontario, March 21, 1931, E. C. Oakley (Lutz).

Hesperocorixa minor (Abbott)

(Plate LXXX, figs 1, 1a-1b)

1913 *Arctocorisa nitida* var *minor* Abbott, J. F Bull Brooklyn Ent Soc , VIII, p 82 (desc, from Georgia).

1926 *Arctocorixa nitida minor,* Blatchley, W S. Heteroptera of Eastern N A , pp 1068 and 1070

1929 *Arctocorixa minor,* Millspaugh, Dick D Field and Lab VII, No 2, p 85 (Texas)

1938 *Arctocorixa nitida minor,* Brimley, C S Insects of North Carolina, p 84

1946 *Arctocorixa nitida* var *minor,* Proctor, William Biol Surv. Mt. Desert Region Inc , Pt. VII. The Insect Fauna, p 82 (recorded from Maine but not seen by me)

Size: Length 7 mm. to 7.4 mm. Width of head across eyes 2.3 mm. to 2.4 mm.

Color: General facies dark. Pronotum with about 8 fairly regular dark bands which tend to coalesce through central portion; pale lineations fine, somewhat zigzag, lines. Corium with dark and pale lines in fairly regular series anteriorly; beyond claval suture the dark pattern tending to coalesce along mesal margin and at end of embolar groove; outer apical angle of corium with V-shaped pale area. Membrane with somewhat lighter pattern anteriorly, but smoky at apex. Rather indistinctly separated from corium by fusion of pale lineations. Embolium smoky. Head, limbs and venter yellow.

Structural characteristics: Head not quite half as long as pronotal disk; vertex rounded; facial hairs few; male fovea very shallow, not attaining eyes laterally. Antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 15 : 50 : 28 males; 1 : 2 : 3 : 4 :: 28 : 16 : 50 : 30 females. Pronotal disk with faint indication of median carina on anterior margin; apex somewhat pointed. Pronotum and hemelytra finely rastrate, membrane shining. Hemelytra with a few long, pale hairs. Lateral lobe of prothorax a little longer than broad; quadrate; apex almost straight. Mesoepimeron narrow, the osteole near the tip. Metaxyphus arrow-shaped; small; no longer than broad.

Front leg of male: Pala long and slender, sides nearly parallel, apex bluntly rounded, with about 20 to 22 teeth, basal carina not prominent; tibia with dorsal carina bearing tuft of about 3 or 4 long spines distally; femur slender, without patch of stridulatory teeth on inner surface. Middle and hind legs slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 40.5 : 32.9 : 40.5; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.3 : 119.6 : 48.8. Male asymmetry dextral. Strigil of moderate size with 6 regular combs. For details of male structures see Plate LXXX, figs. 1 to 1b.

Nomenclatorial notes: Although this species was named as a variety of *H. nitida* (Fieb.), our studies of the two indicate that they are distinct species.

Comparative notes: In this species the mesosternum is medianly produced behind, but is not bidentate. It differs from *minorella* (Hungfd.) in having a narrow mesoepimeron with the osteole near the tip.

Location of types: Cornell University, Ithaca, New York. Holotype a male labeled "Gainesville, Ga., April 2, 1911, coll. by J. C. Bradley." Paratype female, "Marietta, Ga., March 5, 1911, J. C. Bradley"; paratype female, "Athens, Ga., J. C. Bradley."

Data on distribution: (Plate LXXXIII.) Described from Georgia and recorded from Massachusetts and North Carolina. The Maine record needs verification. We have seen the following:

U. S. A.: *Massachusetts:* (Uhler Coll.), 2 females.

New York: Cold Springs Harbor, Aug. 13, 1920, H. M. Parshley (Parshley Coll.), 1 male, 2 females.

Rhode Island: Kingston, Oct. 7, 1907, 1 male.

New Jersey: Lakehurst, July 17, 1923, L. B. Woodruff, 1 female; Monmouth Co., Allaire, July 15-31, 1934, Reeve Bailey (Mich. Coll.), 2 males, 1 female.

Pennsylvania: Philadelphia, July 6, 1921, J. C. Lutz (Lutz Coll.), 1 male; Stony Run, Nov., 1883 (Uhler Coll.), 1 male, 2 females.

Maryland: Great Falls, Dec. 11, 1925, D. H. Clemons, 1 male; Hyattsville, April 4, 1911, W. D. Appel, 1 female; Hyattsville, Aug 23, 1914, W. D. Appel (U. S. N. M.), 1 male, 4 females; Pawtuxent Wild Life R., April 11, 1945, R. I. Sailer (U. S. N. M.), 2 males, 1 female; Maryland, Oct. 6 (Nat. Mus.), 2 males, 4 females; Bladensburg, July 8, 1892 (O. Heidemann, Cornell U.), 2 males, 3 females.

Virginia: Church Cr., Sept. 9, 1906, D. H. Clemons, 1 female; Great Falls, May 22, 1906, D. H. Clemons, 1 male, 2 females.

Washington, D. C.: D. H. Clemons, 1 male; Rock Creek, March 19, 1905, D. H. Clemons, 1 male; April 4 (O. Heidemann, Cornell U.), 3 males; Sept. 18 (O. Heidemann, Cornell U.), 1 male, 3 females; Oct. 27 (O. Heidemann, Cornell U.), 2 males, 4 females.

North Carolina: Raleigh, Nov. 16, 1905, 3 males, 2 females (O. Heidemann, Cornell U.); Raleigh, March 1, 1905, 2 females (O. Heidemann, Cornell U.); Raleigh, April 11, 1906, C. S. Brimley, 1 female.

South Carolina: Clemson Coll., March 24, 1931, D. Dunavan (S. C. Exp. Sta.), 4 males, 1 female; Richland, March 26, 1931, D. Dunavan (S. C. Exp. Sta.), 1 female; Rocky Bottom, Pickens Co., Sept. 20, 1931, D. Dunavan (S. C. Exp. Sta.), 3 males.

Georgia: Wrens, Aug. 22, 1930, P. W. Oman, 14 males, 24 females; Perry, Aug. 12, 1939, J. D. Beamer, 2 males, 1 female; Stone Mt., Aug. 3, 1912 (C. T. Dodd Coll.), 1 female; Marietta, March 5, 1911, J. C. Bradley, 2 females; Stone Mt., Aug. 5, 1912 (Cornell), 4 females; Gainesville, April 2, 1911, J. C. Bradley (holotype) (Cornell U.); Marietta, March 5, 1911, J. C. Bradley (paratype) (Cornell U.); Athens, J. C. Bradley (paratype) (Cornell U.).

Alabama: Mt. Meigs, July 21, 1930, R. H. Beamer and L. D. Tuthill, 1 male, 1 female.

Mississippi: Lauderdale, Aug. 17, 1930, R. H. Beamer, 1 male.

Texas: Woods Co., Feb. 26, 1939, D. D. Millspaugh, 1 male.

Hesperocorixa lucida (Abbott)

(Plate LXXX, figs. 4, 4a-4b)

1916. *Arctocorisa lucida* Abbott, J. F Ent. News XXVII, p 341 (desc from Conn., R. I. and Mass).

1917. *Arctocorixa lucida*, Van Duzee, E. P Catalogue of Hemiptera . . . , p. 482.

1917 *Arctocorisa lucida*, Parshley, H. M. Occ Papers Boston Soc. Nat. Hist., VII, p. 117.

1923. *Arctocorisa lucida*, Abbott, J F. Hemiptera or Sucking Insects of Connecticut *in* Bull. Geol Nat Hist. Surv. Hartford, Conn. XXXIV, p 389, fig 36, Nos. 3 and 9.

1926. *Arctocorixa lucida*, Blatchley, W. S Heteroptera of Eastern North America, pp. 1069, 1072, fig 9.

1928. *Arctocorixa lucida*, Hungerford, H. B. Ent News, XXXIX, p. 156 (records Baker Co , Ga.).

1928. *Arctocorixa lucida*, Hungerford, H B. Annals Ent. Soc Amer., XXI, pp 140-141, Pl. VIII, figs. 7 and 8.

1930 *Arctocorixa lucida*, Walley, G. S. Can. Ent. LXII, p. 280 (records Pt. Pelee, Ont.).

1936 *Sigara (Anticorixa) lucida*, Jaczewski, T Proc Royal Ent. Soc. London, V, Pt 2, Ser. B, p. 43.

1938 *Arctocorixa lucida*, Brimley, C S Insects of North Carolina, p 84

Size: Length 8.5 mm. to 9.4 mm. Width of head across eyes 2.8 mm. to 3 mm.

Color: General facies dark. Pronotum usually unicolorous, but sometimes with 7 to 8 brown bands faintly indicated. Clavus usually solid brown, but sometimes with a few obscure pale lines showing interiorly. Suture between clavus and corium marked with yellow. Corium showing irregular brown pattern which is etched away along margins and along membranal suture. Embolium sordid to smoky. Membrane smoky, with faint pattern or none.

Structural characteristics: Head not quite half as long as pronotal disk, vertex produced; facial hairs sparse; male fovea ovate, shallow, not attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 28 : 20 : 60 : 31 ♂ ; 1 : 2 : 3 : 4 :: 30 : 21 : 61 : 30 ♀. Pronotum with faint median carina anteriorly; apex somewhat rounded but not as much as in *H. escheri* (Heer). Pronotum and hemelytra finely rastrate. Hairs on hemelytra scanty. Lateral lobe of prothorax quadrate, apex straight, no longer than broad. Mesoepimeron narrow, the osteole near the tip. Metaxyphus arrow-shaped, slightly broader than long.

Front leg of male: Pala with sides nearly parallel, the distal end almost truncate, with about 20 pegs, basal carina prominent; tibia with short dorsal carina bearing tuft of 4 or 5 spines near distal end; femur relatively slender, with about 8 rows of stridulatory teeth on inner basal portion. Middle and hind legs slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 44.4 : 37.7 : 41.1. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92 : 130 : 42. Male asymmetry dextral. Strigil of medium size, ovate, of about 8 regular combs. For details of male structures see Plate LXXX, figs. 4 to 4b.

Comparative notes: This species may be distinguished from other *Hesperocorixa* by the incomplete corial pattern.

Location of types: "Holotype, a male from Cheshire, Conn., May 6, 1911 (B. H. Walden). Allotype female, same data. Paratypes from Kingston, Rhode Island, New Haven and Hamden, Connecticut, Forest Hills, Mass." I found these in Doctor Parshley's collection bearing red type and paratype labels, "*A. lucida.*" It is a mixed lot. The holotype, allotype and 3 paratypes, 2 males, 1 female, "Cheshire, Conn., May 6, 1911, B. H. Walden; 2 males, 1 female, same place, March 20, 1911; 2 females, Hamden, Conn., June 1, 1911, B. H. Walden; 1 female, New Haven, Conn., Aug. 12, 1913, B. H. Walden; 1 female, Forest Hills, Mass., Nov. 1, 1915, H. M. Parshley; 1 male, 1 female, Forest Hills, Mass., May 4, 1915, H. M. Parshley; 1 female, Mass. Coll. of H. M. Parshley, No. 64; 1 male, Kingston, R. I.. May, 1908." The above are "*A. lucida.*" The following labeled as paratypes of *A. lucida* are not that species: "Durham, N. H., Oct. 4, 1901," 1 female, is *H. atopodonta* (Hungerford); "Hamden, Conn., June 1, 1911, B. H. Walden," 2 males, 2 females, are *H. kennicottii* (Uhler).

Through the kindness of Doctor H. M. Parshley, the holotype and allotype are deposited in the Francis Huntington Snow Collections, University of Kansas, while most of the paratypes have been returned to Doctor Parshley.

Data on distribution: (Plate LXXXV.) The published records are Massachusetts, Rhode Island and Connecticut in the United States, and Ontario, Canada. We have studied the following:

U. S. A.: *New York:* Ithaca, Spender L., July 4, 1918, 13 males, 1 female; Ithaca, Sept. 9, 1915, R. C. Smith (Drake) 1 male; V. Cortlandt Park, Aug. 3, 1925 (Wash. U. Coll.), 5 males, 7 females; Yaphank, L. I., Sept. 11, 1925 (Wash. U. Coll.), 1 male, 3 females; White Plains, July 16, 1907 (Wash. U. Coll.), 1 female.

Massachusetts: North Saugus, Aug. 25, 1908, D. H. Clemons, 1 female; Cambridge, 1 male; Natick, April 24, 1924, L. B. Woodruff, 1 female; Berlin, Sept. 8, 1935, C. A. Frost (U. S. N. M.), 1 female.

Connecticut: Cheshire, May 6, 1911, B. H. Walden, 1 male, 1 female,

Rhode Island: Kingston, May 5, 1908 (Abbott Coll.), 1 male.

Pennsylvania: Philadelphia, Aug., 1914, Carl Ilg, 2 males, 3 females; Philadelphia, June 30, 1941, J. C. Lutz (Lutz); Philadelphia, Aug. 5, 1929, J. C. Lutz (Lutz).

New Jersey: Great Piece, May, 1902, 2 females; Riverton, Aug. 17, 1902, Van Duzee (Van Duzee), 1 male; Trenton, Oct., 1903, Hussey, 3 males, 6 females; Paterson, April, 1921, 1 male, 1 female; Iona, July 7, 1938, J. C. Lutz, 3d (Lutz).

Maryland: Bladensburg, July 8, 1892 (O. Heidemann, Cornell U.).

Washington, D. C.: July, 1910 (Cornell U. Coll.), 6 males; Feb. 24, 1929, H. S. Barber (U. S. N. M.), 1 male, 4 females; (Uhler Coll.), 1 male.

Virginia: Norfolk, Aug. 11, 1925, Beamer and McKinstry, 38 males; Norfolk, April 9, 1932, L. D. Anderson, 50 females.

Georgia: Baker Co., Nov. 23, 1927, C. H. Martin, 4 males, 5 females.

Florida: Gainesville (Drake).

Texas: 1 male.

Arkansas: Hope, May 3, 1926, L. Knobel (Lutz).

Illinois: (Uhler Coll.) 1 male, 1 female; N. Illinois, W. H. Ashmead, 1 male, 1 female.

Michigan: Nigger Cr., Mullet L., July 30, 1925, H. B. Hungerford, 6 females; Berrien Co., June 30, 1919, R. F. Hussey (Hussey Coll.), 3 males, 2 females; Washtenaw Co., Frain's L., July 21, 1930, G. Cooper (Mich. Coll.), 1 male, 2 females.

Hesperocorixa escheri (Heer)

(Plate LXXXI, figs 4, 4a-4c)

1853. *Corisa escheri* Heer, O. Die Insecten fauna der Tertiargebilde von Oeningen . . . III, p 87 (footnote). (Described from New Georgia, Coast of Washington Territory.)

1876. *Corixa escheri*, Uhler, P. R. Bull. U. S. Geol. and Geog. Surv. of Terr. No. 5, Vol. I, p. 341 (transl. of original description); also reprint of same separately paginated.

1909. *Arctocorisa escheri*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue in Proc. Ent. Soc. Wash. X, p. 195.

1917. *Arctocorixa escheri*, Van Duzee, E. P. Catalogue of Hemiptera, p. 480.

1936. *Arctocorixa scabricula* Walley, G. S. Can. Ent., LXVIII, pp. 56-58, Pl. II, figs. 11 and 12.

1945. *Arctocorixa scabricula*, Griffith, M. E. Univ. of Kans. Sci. Bull. XXX, Pt. II, No. 14, p. 300.

Size: Length from 10.2 mm. to 11.4 mm. Width of head across eyes 3.3 mm. to 3.7 mm.

Color: General facies medium to dark brown. Head, venter and legs all yellow in pale specimens; legs in darker specimens pale reddish-brown. Pronotum crossed by 8 to 9 dark bands, those beyond center somewhat broken and irregular. Hemelytral pattern in regular transverse series on clavus and on base of corium; pattern on corium beyond claval suture more broken. Pattern of membrane continuous with that of corium. Embolium yellowish white.

Structural characteristics: Head more than half the length of the pronotal disk. Eyes convex, in some specimens almost bulging; vertex rounded. Frontal impression of male shallow, ovate, not attaining eyes laterally. Facial hairs few. Antennal segmentation: 1 : 2 : 3 : 4 :: 30 : 28 : 57 : 40 ♂; 1 : 2 : 3 : 4 :: 1 : 2 : 3 : 4 :: 35 : 29 : 65 : 47 ♀. Pronotal disk slightly less than half as long as wide and rounded at apex; carina faintly visible on anterior margin. Pronotum rather rough and both pronotum and hemelytra rastrate, membrane shining. Hemelytra with a few long, yellow-white hairs. Lateral lobe of prothorax about as broad as long. Mesoepimeron slender with scent gland osteole located almost at tip. Metaxyphus arrow-shaped, slightly longer than broad.

Male pala long and slender with sides almost parallel, blunt at apex, 28 to 30 teeth, largest in center; basal carina prominent. Tibia with short dorsal carina having tuft of 5 or 6 spines at distal end. Femur long and moderately slender, with patch of about 12 rows of stridulatory teeth on inner basal portion. Middle and hind legs long and slender, the proportions of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 41.4 : 36.5 : 38.9; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100.2 : 146.9 : 50.1. Male asymmetry dextral. Strigil moderately large, suboval, with 9 to 10 rows of regular combs. For details of male abdomen and genitalia see Plate LXXXI, figs. 4-4c.

Comparative notes: The convex, slightly bulging eyes and the fact that the head is more than half the length of the pronotal disk, plus the rounded appearance of the latter, will serve to separate this species from other *Hesperocorixa.* In addition, this species, *laevigata* and *georgiensis* are the only ones which have the tibia of the hind leg longer than the femur.

Location of type: Unknown to me. Heer's types are supposed to be at Zürich.* The *Arctocorixa scabricula* Walley was described from 4 males, 7 females from "Guelph, Ontario." The holotype, allotype and 2 males, 5 females paratypes in Canadian National Museum, Ottawa, Ont.; 1 male and 1 female in Francis Huntington Snow Collection, University of Kansas. Many years before Mr. Walley described his species I had assigned this species to *C. escheri* because of its very short pronotum and other similarities to Heer's description.

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* Prof Dr A Jeannet, under date of Feb. 21, 1947, says this type is no longer there

Data on distribution: (Plate LXXXIV).

CANADA: *Ontario:* Guelph, Aug. 3, 1931, W. H. G. Patton, 2 females; Guelph, Sept., 1931, W. H. G. Patton, 1 male, 1 female.

Manitoba: Cowan, March 7, 1937, H. T. Peters, 1 male, 3 females; Winnipeg, Sept. 2, 1916, J. B. Wallis (Wallis), 1 male, 3 females.

U. S. A.: *Minnesota:* St. Louis Co., Aug. 14, 1922, H. B. Hungerford, 56 males, 42 females; Grand Marais, Aug. 13, 1922, H. B. Hungerford, 44 males, 33 females; Hibbing, Aug. 18, 1922, H. B. Hungerford, 1 male; St. Paul (golf pond), July 14, 1921, H. B. Hungerford, 3 males, 6 females; St. Paul, June 29, 1921, W. E. Hoffmann (Minn. Coll.), 1 male, 2 females; Stillwater (dirty pond), 1 male.

Illinois: Chicago, July, C. T. Brues (Parshley), 1 male.

Michigan: Douglas Lake, Aug. 6, 1924, H. B. Hungerford, 1 male, 1 female; July 24, 1925, same place and collector, 1 male; Aug. 12, 1925, same place and collector, 2 males; North Michigan, Aug. 23, 1930, H. B. Hungerford, 1 female.

Hesperocorixa laevigata (Uhler)

(Plate LXXXI, figs. 3, 3a-3b)

1893 *Corisa laevigata* Uhler, P R Proc Ent Soc Wash II, pp 384-385 (Desc. from Salt Lake, Calif., Nev., Wash Terr., and Oregon.)

1894. *Corisa laevigata*, Uhler, P R Proc Calif Acad Sci, ser 2, IV, p. 295 (Lower California.)

1909 *Arctocorisa laevigata*, Kirkaldy, G W, and Torre-Bueno, J R de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p 196

1917 *Arctocorixa laevigata*, Van Duzee, E. P. Catalogue of Hemiptera . , p. 481.

1925 *Arctocorixa laevigata*, Hungerford, H. B. Bull. Brooklyn Ent Soc XX, No. 1, p 17 (Ariz., Tex., Utah, Idaho.)

1925. *Arctocorixa laevigata*, Hungerford, H. B Bull. Brooklyn Ent. Soc. XX, No. 3, p. 142. (N. J., Md., and R. I.)

1926. *Arctocorixa laevigata*, Blatchley, W S Heteroptera of Eastern N. A., pp. 1068, 1086.

1928. *Arctocorixa laevigata*. Torre-Bueno, J R. de la. A List of the Insects of New York, p. 141, *in* Cornell Univ. Agri. Exp. Sta. Memoir 101.

1928. *Arctocorixa laevigata*, Hungerford, H. B. Ent. News XXXIX, p 156 (records New Mexico).

1936. *Sigara* (*Anticorixa*) *laevigata*, Jaczewski, T. Proc. Royal Ent. Soc London, V, Pt. 2, Ser. B, p. 42.

1939. *Arctocorixa laevigata,* Millspaugh, Dick D. Field and Lab., VII, No. 2, p. 85.
1943. *Corixa laevigata,* Walton, G. A. Trans. Soc. British Entomology, VIII, Pt. 5, p. 161.

Size: Length 9.9 mm. to 11 mm. Width of head across eyes 3.2 mm. to 3.6 mm.

Color: General facies dark. Pronotum crossed by about 12 quite irregular dark bands; no pale median stripe. Dark pattern of clavus in wavy, zigzag lines, the pale lines very slender and slightly more regular. Corial pattern not quite so broken and the dark lines not so wide. Pattern of membrane much interrupted; membranal suture indistinct. Embolium silvery white. Venter and limbs yellow.

Structural characteristics: Head one-third as long as pronotal disk, broadly rounded. Vertex sometimes slightly produced in females; interocular space broader than an eye as measured by projection; facial hairs scanty, male fovea very shallow, ovate, not attaining eyes laterally. Antennal segmentation: 1 : 2 : 3 : 4 :: 30 : 22 : 60 : 45 males; 1 : 2 : 3 : 4 :: 31 : 25 : 63 : 45 females. Pronotal disk with very faint indication of median carina on anterior margin; apex slightly pointed. Pronotum nonrastrate, shining; the clavus and corium somewhat rastrate to rugulose. Hemelytra with fairly numerous long pale hairs. Pruinose area of embolar groove posterior to nodal furrow about one-third as long as embolium. Lateral lobe of prothorax quadrate, slightly rounded at apex, as broad as it is long. Mesoepimeron narrow, the scent gland osteole near tip. Metaxyphus arrow-shaped, pointed at apex, longer than broad.

Front leg of male: Pala with sides subparallel, broad, bluntly rounded at distal end, with about 24 to 26 teeth in peg row, carina at base not prominent; tibia with slight dorsal carina, bearing a single long spine near distal margin; femur moderately slender, without rows of stridulatory pegs on inner basal portion. Middle and hind legs moderately slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 49 : 36.7 : 35.7. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 101.8 : 125.8 : 55.5. Male asymmetry dextral. Strigil moderately long, sides parallel, ends round, of about 6 to 8 regular combs. For details of male structures see Plate LXXXI, figs. 3, 3a and 3b.

Comparative notes: The reticulate pattern of the hemelytra will serve to distinguish this species from all other *Hesperocorixa.*

Location of types: I find in the Uhler Collection of the U. S. National Museum the following type series: "San Diego, Cal., 10-19-1890, *Corixa laevigata* Uhler," 1 male, 2 females; "Cala," 1 male, 1 female; "Coronado, Cal.," 1 male; "Sonoma Co., Calif.," 1 male;

Coupeville, Wash., 1 male; "Nev.," 1 female. Have labeled the male from San Diego, Cal., as the lectotype and the others as cotypes.

Data on distribution: (Plate LXXXIII.) The published records include: Utah, California, Wash. Terr., Oregon, Lower California, Arizona, Texas, Idaho, New Jersey, Maryland and Rhode Island. We have before us the following:

CANADA: *British Columbia:* Peachland, Aug. 20, 1901, J. B. Wallis (Wallis Coll.), 1 male; Peachland, Oct. 7, 1931, A. N. Gartrell, 3 males; Sept. 11, 1945, H. B. Leech, 2 females; Oliver, Aug. 6, 1931, L. D. Anderson, 2 males, 1 female; Chiliwack, July 9, 1925, 2 females; Kamloops, Nov. 1, 1929, Owen Bryant (Bryant Coll.), 3 females; Cranbrook, Sept. 17, 1928, J. H. Pepper (Bryant Coll.), 1 male, 2 females; Vernon, Dec. 12, 1908, Parshley (Parshley Coll.), 2 females; Vernon, Sept. 26, 1929, W. Downes, 3 males, 1 female; Metchosin, Aug. 30, 1929, W. Downes, 1 male, 1 female; Sahack's Lake (Uhler Coll.), 1 male.

Alberta: MacLeod, Sept. 15, 1928, Owen Bryant (Bryant Coll.), 2 males; Lethbridge, May 8-20, 1930, J. H. Pepper (Bryant Coll.), 6 females; Chin; Sept. 7, 1929, J. H. Pepper (Bryant Coll.), 1 male, 5 females.

Manitoba: Mafeking, Aug. 3, 1937, C. L. Johnston, 1 male; Aweme, Sept. 11, 1916, Norman Criddle, 2 females.

U. S. A.: *Washington:* Kalama River, July 21, 1931, L. D. Anderson, 1 male; Pullman, Aug. 6, 1900, C. V. Piper, 1 male; Pullman, March 7, E. P. Van Duzee (Van Duzee).

Oregon: Modoc Point, July 11, 1935, R. H. Beamer, Jr., 1 male; Hood River, July 17, 1931, L. D. Anderson, 1 male, 1 female; Boardman, July 15, 1931, L. D. Anderson, 1 female; Hot Lake, July 13, 1931, L. D. Anderson, 1 female; North Powder, July 13, 1931, L. D. Anderson, 8 males, 4 females; Worden, July 1, 1935, R. H. Beamer, Jr., 1 male, 1 female; Corvallis, Dec. 16, 1900 (Drake Coll.), 1 male, 2 females; Harney Co., Trout Creek, July 26, 1934, C. L. Hubbs (Mich. Coll.), 1 male, 3 females; Klamath Co., Klamath R., Aug. 15, 1934, C. L. Hubbs (Mich. Coll.), 9 males, 14 females; Malheur Co., July 24, 1934, C. L. Hubbs (Mich.); Lake Co., Ruby Lake, Sept. 12, 1934, C. L. Hubbs (Mich.); Lake Co., Quartz Creek, Aug. 9, 1934, C. L. Hubbs (Mich.); Lake Co., Warner Lake, July 30, 1934, C. L. Hubbs (Mich.); Lake Co., Plush, July 29, 1934, C. L. Hubbs (Mich.); Harney Co., Denio, Aug. 3, 1934, C. L. Hubbs (Mich.); Klamath Co., Lost R., Aug. 11, 1934, C. L. Hubbs (Mich.).

California: San Bernardino Co., Mohave R., Aug. 31, 1934, C. L. Hubbs (Mich.), 1 female; Ventura Co., Simi, Aug. 26, 1934, C. L. Hubbs (Mich.), 2 males, 1 female; California, T. H. Hubbell (Hubbell Coll.), 3 males, 4 females; Berkeley, June, 1917, W. W. Henderson (Utah Exp. Sta.), 2 males, 2 females; Laguna Beach, C. T. Dodd, 15 males, 18 females; Berkeley, Sept. 23, 1915, E. C. Van Dyke (Calif. Acad.); Laguna Mts., July 6, 1929, L. D. Anderson, 3 females; Sonona Co. (Hussey Coll.), 1 male; Paso Robles, April 22, 1928, L. S. Slevin (Calif. Acad.); Sonona Co. (Parshley Coll.), 1 male, 2 females; Sonona Co. (Uhler Coll.), 1 female; California (Uhler Coll.), 1 male, 2 females; Fresno Co., 9,000 ft., Mt. Kaiser, Aug. 2, 1919, F. E. Blaisdell (Calif. Acad.); San Diego (Uhler Coll.), 1 male, 2 females; San Diego Co., Oct. 17, 1913, E. P. Van Duzee (Van Duzee); Coronado (Uhler Coll.), 1 male; Stanford U., 2 males, 1 female; Vine Hill, Contra Costa Co., July 5-10, 1911, E. Blaisdell (Calif. Acad.); Stanford U. (Torre-Bueno Coll.), 1 female; Napa Mts., Napa Co., 1,000 ft., 1 female; Idyllwild, Aug. 3, 1935, J. Beamer, 6 males, 6 females; Sequoia Nat. Park, Aug. 6, 1940, L. C. Kuitert, 1 male, 1 female; Mint Canyon, July 6, 1933, J. D. Beamer, 5 males, 3 females; Weed, June 29, 1935, R. H. Beamer, 10 males, 19 females; Mammoth Lakes, July 20, 1940, L. C. Kuitert, 1 male; Alpine, July 9, 1929, R. H. Beamer, 1 male, 3 females; San Jacinto Mts., July 21, 1929, P. W. Oman, 2 males, 3 females; Calexico, Aug. 1, 1931, H. W. Capps, 1 male; Bantista Canyon, April 8, 1931, C. H. Martin, 1 female; Canby, Kelly Springs, 1931, C. T. Brues, 1 female; Los Banos, May 22, 1918, E. P. Van Duzee; Antioch, July 20, 1935, R. H. Beamer, 1 female; Tejon Pass, July 28, 1918, J. O. Martin; Arroyo Seco, Aug. 8, 1938, R. I. Sailer, 3 males, 6 females; Onyx, July 23, 1940, L. C. Kuitert, 5 males, 6 females; Lone Pine, July 28, 1940, L. C. Kuitert, 3 males, 3 females; Red Bluff, June 27, 1935, Jack Beamer, 1 male, 1 female; Palmdale, July 22, 1940, L. C. Kuitert, 6 males, 7 females; Palmdale, June 9, 1918, J. O. Martin; Little L., July 22, 1940, L. C. Kuitert, 7 males, 5 females; Jacumba, July 17, 1940, L. C. Kuitert, 1 male, 3 females; Campo, July 18, 1940, L. C. Kuitert, 1 male, 8 females; Al Tohoe, June 28, 1929, R. L. Usinger (Calif. Acad.); St. Helena, Sonora Co., July, 1907, P. Bomberger (Calif. Acad.); Berkeley, April 26, 1933, Jean Linsdale, 1 female; Monrovia Canyon, March 2, 1930, C. H. Martin, 1 female; Marin Co., Aug. 3, 1929, L. D. Anderson, 1 female; Carmel, Aug. 30, 1938, L. S. Slevin, 1 female; Modoc Co., July 31, 1934, C. L. Hubbs (Mich.); Walnut Creek, Aug. 9, 1929, R. L. Usinger, 2 males; Oakland Hills, April 22, 1927, R. L. Usinger, 2 females; Santa Barbara, July 7, 1907 (Drake Coll.), 1 male, 3 females; Benton, Hot Springs, Oct. 7, 1942, A. P. McKinstry, several hundred specimens; Keeler, July 6, 1914, Wickham, 1 male; Monterey, April 23, 1923, L. S. Slevin (Calif. Acad.); San Francisco, Wickham, 1 female; San Francisco, Sept. 5, 1909, J. A. Kusche (Calif. Acad.).

Idaho: Soldier (Nebr. Coll.), 1 male, 2 females; Clark Co., Medicine Lodge, July 17, 1934, C. L. Hubbs (Mich. Coll.), 1 male, 1 female; Clark Co., Beaver Cr., July 16, 1934, C. L. Hubbs (Mich. Coll.), 2 males; Blaine Co., Fish Cr., July 22, 1934, C. L. Hubbs (Mich.), 2 males; Snake River (Uhler Coll.), 1 male, 1 female; Burley, July 6, 1931, L. D. Anderson, 36 males, 49 females; Moscow (Bueno Coll.), 1 male, 2 females.

Utah: Garfield, July 9, 1911 (Bueno Coll.), 1 female; Utah (Uhler Coll.), 1 male; Utah (U. S. Nat. Mus.), 1 female; Tooele, pond, Aug. 23, 1937, L. L. Hansen, 1 male, 2 females; Lehi, April 4, 1930, G. F. Knowlton (Utah Exp. Sta.), 1 male; Hyde Park, April 19, 1930, G. F. Knowlton (Utah Coll.), 1 female; Duchesne, Aug. 17, 1940, L. C. Kuitert, 1 male; Logan, Nov. 5, 1930, M. J. James, 1 male, 3 females; Emery Co., 1921-1922, G. C. Wiley, 268 males, 221 females; Salt Lake, March 15, 1901, R. Usinger, 1 male; Ogden, July 5, 1891. O. Heidemann (Cornell U. Coll.), 2 females; Providence, Oct. 3, 1931, D. M. Hammond (Utah Exp. Sta.), 1 male; Jensen, June 5, 1935, F. C. Harmston (Utah Exp. Sta.), 2 females; Brigham, Aug. 16, 1934, G. F. Knowlton (Utah Exp. Sta.), 2 males, 6 females; Brigham, Aug. 16, 1934, F. H. Gunnell (Utah Exp. Sta.), 1 male; Logan, Sept. 28, 1932, B. G. Whitaker (Utah Exp. Sta.), 2 males, 2 females; Logan, Oct. 5, 1930, Melvin Jensen, 5 males, 3 females (Utah Exp. Sta.); Logan, Nov. 20, 1933, T. O. Thatcher (Utah Exp. Sta.), 2 females; Logan, Sept. 11, 1937, F. C. Harmston (Utah Exp. Sta.), 3 females; Sardine Canyon, Aug. 3, 1935, C. F. Smith (Utah Exp. Sta.), 1 male, 3 females; Grantsville, April 27, 1930, G. F. Knowlton (Utah Exp. Sta.), 1 male; West Bountiful, March 10, 1934, H. B. Stafford (Utah Exp. Sta.), 1 female; Wellsville, Aug. 16, 1934, Knowlton and Smith (Utah Exp. Sta.), 1 female; Delta (at light), July 5, 1938, Stains and Knowlton (Utah Exp. Sta.), 1 female; American Forks, April 4, 1930, G. F. Knowlton (Utah Exp. Sta.), 1 female; Lehi, June, 1934, G. F. Knowlton (Utah Exp. Sta.), 2 males, 1 female; Logan Meadows, March 31, 1929, G. F. Knowlton (Utah Exp. Sta.), 2 males, 3 females; Logan, Dec. 8, 1935, R. E. Nye (Utah Exp. Sta.), 2 males, 1 female; Far

West, Feb. 7, 1934, W. L. Thomas (Utah Exp. Sta.), 1 male; Hooper, July 1, 1936, G. F. Knowlton (Utah Exp. Sta.), 1 male, 2 females; Farmington, Aug 26, 1936, G. F. Knowlton (Utah Exp. Sta), 1 male, 2 females; Syracuse, July 6, 1936, G. F. Knowlton (Utah Exp. Sta.), 1 female; Spanish Fork, July 24, 1936, G. F Knowlton (Utah Exp. Sta.), 3 females.

Nevada: Austin, Aug. 12, 1940, L. C. Kuitert, 1 male, 1 female; Reno, Oct.-Nov., 1939, L. A. Rivers, 2 males, 2 females; Sunnyside, 1930, C. T. Brues, 1 male, 1 female; Carson City, Aug. 9, 1929, L. D. Anderson, 20 males, 28 females; Ely, Aug. 13, 1940, L. C. Kuitert, 12 males, 13 females; Reno, Aug. 15, 1936, Owen Bryant (Bryant Coll.), 1 male, 5 females; Nevada (Uhler Coll.), 1 female; Warm Spring, Sept. 8, 1934, C. L. Hubbs (Mich.); Esmeralda Co., Fish Lake, Sept. 5, 1934, C. L. Hubbs (Mich. Coll.), 1 female; Elko Co., Sept. 14, 1934, C. L. Hubbs (Mich. Coll.), 4 males, 5 females; Nye Co., Sept. 3, 1934, C. L. Hubbs (Mich Coll.), 3 males, 2 females

Arizona: Apache Co., Springerville, Aug. 17, 1935, I. J. Cantrall (Mich.), 2 males, 5 females; Yavapai Co., Peoples Valley, 6 mi n. Yarnell, May 19, 1937, L. K. Gloyd (Mich. Coll.), 1 male, 1 female; Huachuca Mts., March 16, 1919, R. D. Camp (Mich. Coll.), 1 male, 2 females; Arizona (U. S. N. M.), 1 female; Foxborough Ranch, Aug. 1, 1936, Owen Bryant (Bryant Coll.), 2 males, 1 female; S. W. edge of Tucson, July 20, 1932, R. H. Beamer, 1 male, 1 female; Chiricahua Mts., July 5, 1940, L. C. Kuitert, 1 male; Ruby, July 12, 1940, L. C. Kuitert, 1 male; Cochise Co., July 20, 1927, R H. Beamer, 3 males, 9 females; Yavapai, Aug. 9, 1927, P. A. Readio and L. D. Anderson, 42 males, 26 females; same place and date, R. H. Beamer, 2 sinistral males; Coconimo Co., Aug. 13, 1927, P A. Readio, 10 males, 10 females; Santa Cruz Co., Aug. 4, 1927, R H. Beamer, 2 males, 2 females; San Bernardino Ranch, Cochise Co., F. H. Snow, 1 male, 1 female; Douglas, August, F. H. Snow, 2 males, 8 females; Mormon Lake, May 1, 1936, Owen Bryant (Bryant Coll.), 2 males, 4 females; Navajo Co., Aug. 15, 1927, L. D. Anderson, 1 female; Pullman, Aug. 6, 1900, 1 female; Oak Creek Canyon, July 9, 1941, L. C. Kuitert, 7 females.

Montana: Montana (Uhler Coll.), 1 male, 3 females; Three Forks, July 22, 1931, L. D. Anderson, 7 males, 9 females; Whitehall, Aug. 13, 1931, L. D. Anderson, 3 males, 1 female; Drummond, Aug. 11, 1931, L. D. Anderson, 2 males, 2 females; Missoula, Aug. 11, 1931, L. D. Anderson, 1 male; Bennett, Aug. 12, 1931,

L. D. Anderson, 2 males, 1 female; Bozeman, April 28, 1916 (Mont. Exp. Sta.), 1 male.

Wyoming: Boulder, Aug. 19,. 1931, L. D. Anderson, 1 male; Sweetwater Co., Green R., Sept. 16, 1934, C. L. Hubbs (Mich. Coll.), 3 females.

Colorado: Denver, July, 1905, Hayden (Uhler Coll.), 1 female; Hillside (6 mi. S.), Aug. 25, 1941, H. C. Severin, 1 male, 1 female; Steamboat Springs, Aug. 21, 1941, H. C. Severin, 2 males, 3 females; La Junta, Aug. 22, 1927, L. D. Anderson, 7 males, 4 females; Las Animas Co., Sept. 22, 1927, R. H. Beamer, 4 males, 6 females; Ft. Collins, Aug. 11, 1900, F. H. Snow, 1 male, 2 females; Denver, July 16, 1909, W. J. Gerhard (Gerhard Coll.), 2 males, 1 female; Ft. Collins, Aug. 17, 1940, 4 males; Univ. of Colo. campus, Oct. 2, 1917, 1 male, 1 female; Pingree Park, Aug. 11, 1926, Beamer and Lawson, 1 female.

New Mexico: Santa Cruz Co., Aug. 20, 1927, L. D. Anderson, 9 males, 6 females; Mesilla Park, July 18, 1927, L. D. Anderson, 1 female; Santa Fe, July 30, 1936, R. H. Beamer, 4 males, 4 females; Socorro Co., Aug. 18, 1927, Beamer, Anderson and Readio, 54 males, 31 females; New Mexico (Uhler Coll.), 2 males, 2 females; Torrence Co., 1925, C. A. Martin.

North Dakota: Lake Metagoshe, July 20, 1937, C. L. Johnston, 1 male.

South Dakota: Belvidere, Sept. 22, 1939, G. A. Sprawn, 2 males; Newell, June 28, 1923, H. C. Severin, 2 females; Wood, July 23, 1929, H. C. Severin, 1 male, 1 female; Vivien, June 20, 1939, H. C. Severin, 1 female; Capa, June 1, 1921, H. C. Severin, 1 male, 4 females; Wasta, July 17, 1937, H. T. Peters, 1 male, 2 females; Draper, July 19, 1937, R. H. Beamer, 4 males, 7 females.

Nebraska: Nebraska (Uhler Coll.), 2 females.

Kansas: Sherman Co., Aug. 1, 1925, R. H. Beamer, 7 males, 5 females; Cheyenne Co., July 3, 1925, R. H. Beamer, 1 male, 1 female; Logan Co., Sept. 22, 1925, R. H. Beamer, 2 females; Scott Co., Aug. 31, 1925, R. H. Beamer, 2 males, 1 female.

Oklahoma: Tulsa Co., March 21, 1922, Grace Wiley, 1 female.

Texas: Bowie Co., Aug. 16, 1928, A. M. James, 3 females; Presidio Co., July 16, 1927, P. A. Readio, 3 males, 6 females; Colorado Co., May 2, 1922, G. C. Wiley, 1 female; Texas (C. V. Riley Coll.), 2 females.

Minnesota: Minnesota (Bueno Coll.), 1 female; Minneapolis, April, 1907, R. A. Vickery (Nat. Mus.), 4 females.

Wisconsin: St. Croix R., Aug. 17, 1928, Schultz and Tarzwell, 1 male (Mich.).

Illinois: N. Illinois (Ill. U. Coll.), 1 female.

Mississippi: Agri. Col., May, 1919, W. G. Raines (Miss. Coll.), 1 male, 2 females.

Ohio: Ohio, L. Shoelch (Bueno Coll.), 1 female.

New York: Carmel, Aug. 12, 1910, 1 female; New York (Uhler Coll.), 3 females; New York, P. R. Uhler (Uhler Coll.), 1 male.

Rhode Island: Rhode Island (Uhler Coll.), 2 males.

Maryland: Maryland (Uhler Coll.), 1 female.

North Carolina: Black Hills (Uhler Coll.), 4 males, 2 females.

MEXICO: Real del Monte, Hidalgo, Sept. 23, 1938, H. D. Thomas, 6 males, 7 females.

Hesperocorixa harrisii (Uhler)

(Plate LXXXI, fig. 2, 2a-2b)

1878. *Corisa harrisii* Uhler, P. R. Proc. Boston Soc. Nat. Hist. XIX, p. 444 (No. 22B in Harris Collection).

1892. *Corisa harrisii*, Osborn, Herbert. Proc. Iowa Acad. Sci. I, Pt. II, p. 120 (Iowa). Record not verified.

1892. *Corisa harrisii*, Uhl. Harrington, W. Hague. Fauna Ottawaensis, Ottawa Naturalist VI, p. 30. Very abundant.

1893. *Corisa harrisii*, Osborn, Herbert. Proc. Iowa Acad. Sci., Vol. I, Pt. IV, p. 123 (records Albuquerque, N. M.) An error in determination.

1894. *Corisa harrisii*. Van Duzee, E. P. Bull. Buffalo Soc. Nat. Sci. V, p. 186 (says quite abundant in a pond at Ridgeway, Ontaria, in August, 1886).

1904. *Corisa harrisii*, Crevecoeur, F. F. Trans. Kans. Acad. Sci. XIX, p. 234 (in stock pond, Mar.-Oct.); (probably *H. vulgaris* Hungerford).

1909. *Arctocorisa harrisii*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 195.

1910. *Arctocorisa harrisii*, Smith, J. B. Insects in N. J., 3d ed., p. 169 *in* Report of N. J. State Museum for 1909.

1913. *Arctocorisa interrupta,* Abbott, J. F. Wash. Univ. Studies I, No. 1, pp. 10-20, fig. 1B. (In part, placed *H. harrisii* as syn. in error.)

1914. *Corixa harrisii*, Parshley, H. M. Psyche XXI, p. 140. (Orono, Maine.) This is *H. atopodonta* Hungerford.

1917. *Arctocorixa harrisii,* Van Duzee, E. P. Catalogue of Hemiptera . . . , p. 481

1925. *Arctocorixa harrisii,* Hungerford, H. B. Bull. Brooklyn Ent. Soc., XX, No. 3, p. 141 (restores to specific rank).

1926. *Arctocorixa harrisii*, Blatchley, W. S. Heteroptera of Eastern N. A., p. 1068, 1070, Pl. XII, fig. 8 (lists Indiana).

1928. *Arctocorixa harrisii*, Torre-Bueno, J. R. de la, *in* A list of the Insects of New York, p. 141 (lists N. Y.).

1930. *Arctocorixa harrisii*, Walley, G. S. Can. Ent. LXII, p. 281 (quotes Van Duzee, 1894).

Size: Length 9.6 mm. to 10.6 mm. Width of head across eyes 3.1 mm. to 3.4 mm.

Color: General facies dark. Pronotum crossed by 10 to 11 dark, irregular bands. Pale pattern of hemelytra in very narrow, more or less regular transverse lines. Dark areas tending to coalesce at inner apical angle of corium. Outer apical angle much paler. Membranal suture indistinctly marked by fusion of pale lines. Head, legs, and margins of venter pale yellowish; coxae and inner surface of venter smoky. Embolium yellowish-white.

Structural characteristics: Head about one-third the length of pronotal disk; vertex slightly produced; facial hairs scanty; male fovea distinct, ovate, not quite attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 32 : 21 : 60 : 40 ♂ ; 1 : 2 : 3 : 4 :: 32 : 21 : 60 : 40 ♀. Pronotal disk with faint median keel on anterior margin; somewhat pointed at apex. Pronotum and hemelytra faintly rastrate, the membrane shining. Hemelytra with a few long white hairs. Pruinose area of embolar groove posterior to nodal furrow about one-third the length of embolium.

Lateral lobe of prothorax quadrate, slightly rounded across apex, plainly broader than long. Mesoepimeron narrow, the scent gland osteole near the tip. Metaxyphus arrow-shaped, no longer than broad.

Front leg of male: Pala subparallel-sided, distal end truncate, 21 to 24 teeth in peg row, basal carina not prominent, pala with basal two-thirds much thickened as seen in dorsal view. Tibia with pronounced dorsal carina bearing tuft of about 4 spines on distal end; femur moderately stout with patch of about 8 to 10 rows of stridulatory teeth on inner basal portion. Male asymmetry dextral; strigil small, long and narrow, of about 8 to 10 regular combs. For details of male structures see Plate LXXXI, figs. 2, 2a and 2b.

Comparative notes: This species is close to *H. vulgaris* (Hungfd.), from which it differs in having the vertex slightly produced. Although the membranal suture is marked by a yellowish line, this division is not nearly so definite as in some of the other species, and in some specimens cannot be found at all.

Location of type: In the Harris collection of the Boston Society of Natural History are Harris No. 22B and 501, labeled by Chas. W. Johnson as cotypes of *Corisa harrisii* Uhler. I examined these in the early 1920's and found that No. 22B, which should be designated the lectotype, lacked the head and prothorax and the abdomen was dermestid-eaten, with part of the caudal segments, the genital capsule and the strigil eaten away. Nevertheless, I was able to find that my determination of the species is correct. The 501 is a female, also dermestid-eaten, but is not *C. harrisii* but *H. lobata* (Hungerford).

Data on distribution: (Plate LXXXIII.) According to Blatchley the range extends from New England to Indiana. We have studied the following:

CANADA: Montreal Island, Quebec, May 30, 1903, purch. from Wash. U. by H. B. H., 1 female.

U. S. A.: *Vermont:* Winooski, Aug. 30, 1901 (Davis Coll.), 1 female.

Massachusetts: Woods Hole, 6 males, 7 females; Springfield, April 19, 1900, F. Knabb, 1 male, 1 female; Wilbraham, Oct. 2, 1902, F. Knabb, 2 females; Forest Hills, May 3, 1922, R. F. Hussey, 1 male; Marblehead, Aug. 8, 1914, H. M. Parshley (Parshley Coll.); Nonamesset Island, July 7, 1911, J. F. Abbott, 85 males, 162 females

Rhode Island: (C. F. Baker in U. S. N. M.).

New Jersey: Ramsey, Sept. 19, 1909, 6 females; Riverton, Aug. 17, 1902, E. P. Van Duzee (Van Duzee).

New York: Long Island, Sept. 25, 1937, J. C. Lutz, 1 male; W Shokan, July 30, 1909 (Amer. Mus. Nat. Hist. Coll.), 1 female, Brooklyn, 1898, W. H. Ashmead, 2 females; Fisher's Island, L. I., Aug. 29, 1890, 1 female; Tompkins Cove, L. I., Aug. 10, 1910, 1 female; Carmel, Aug. 12, 1910, 1 female; New York, May 29, 1899, J. B. Southwick, 1 female; Cold Springs Harbor, L I, July 26, 1920, Priscilla Butler (Hussey).

Hesperocorixa vulgaris (Hungerford)

(Plate LXXXI, figs 6, 6a-6b)

1925 *Arctocorixa vulgaris* Hungerford, H B Bull Brooklyn Ent Soc XX, pp 143-144, Pl VI, figs 1 and 2 (desc from Kansas and records from South Dakota, Minnesota, Michigan, Ohio and New York)

1926 *Arctocorixa vulgaris*, Blatchley, W S Heteroptera of Eastern North America, pp 1069, 1071 (Records "Mass. and west to Ohio and S D")

1928 *Arctocorixa vulgaris*, Torre-Bueno, J R de la List of Insects of New York, p 141 *in* Cornell Univ. Agri Exp Sta Memoir 101

1930 *Arctocorixa vulgaris*, Walley, G S Can Ent LXII, p 281 (records Ontario and Quebec, Canada).

1931 *Sigara (Anticorixa) vulgaris* Jaczewski, T Arch fur Hydrobiol XXIII, pp 514-516, figs 17-19. (Records Tacoma, Wash, in Hamburg Mus)

1936 *Sigara (Anticorixa) vulgaris*, Jaczewski, T Proc Royal Ent Soc London, Ser B, V, Pt 2, p 42

1946 *Arctocorixa vulgaris*, Proctor, Wm Biol Surv Mt Desert Region, Inc Pt VII The Insect Fauna, p. 88 (Mt. Desert Isl, Maine)

Size: Length 9.2 mm. to 10.1 mm. Width of head across eyes 3 mm. to 3.3 mm.

Color: General facies dark. Pronotum crossed by about 10 broad dark bands, regular except ~~one or two toward posterior~~ margin. Clavus with broad, dark bands in somewhat zigzag transverse series. Corium transversely marked with pale, slender, slightly zigzag lines. Pale bands beyond hemelytral suture forming a slender, transverse series. Corium and membrane not clearly separated. Pattern on membrane more broken than that on corium. Head and limbs pale. Venter, of male at least, dark. Embolium yellowish white.

Structural characteristics: Head slightly more than one-third the length of the pronotal disk; vertex not produced, interocular space broad; facial hairs long but scanty; male fovea shallow, ovate, not attaining eyes laterally. Antennal segmentation: 1 : 2 : 3 : 4 :: 30 : 21 : 50 : 40 ♂ ; 1 : 2 : 3 : 4 :: 28 : 21 : 50 : 40 ♀. Pronotal disk with faint indication on anterior margin of median carina; apex somewhat pointed. Pronotum and hemelytra heavily rastrate. Hemelytra with a very few pale hairs. Lateral lobe of prothorax quadrate, apex slightly rounded, no longer than broad. Mesoepimeron slender with osteole near the tip. Metaxyphus arrow-shaped, no longer than broad.

Front leg of male: Pala with sides nearly parallel, the apex slightly produced, about 18 to 20 pegs in peg row, basal carina prominent; tibia with short dorsal carina bearing tuft of about 3 short spines distally; femur rather stout, with patch of about 9 rows of stridulatory pegs on inner surface near base. Middle and hind legs slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 42.6 : 33.6 : 33.6; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 83.9 : 107.7 : 45.4. Male asymmetry dextral. Strigil long and slender, of 5 regular combs. For details of male structures see Plate LXXXI, figs. 6 to 6b.

Comparative notes: This species is nearest to *H. harrisii* (Uhl.) from which it differs in having a shallower male fovea, in not having the vertex produced, and in not having the lateral lobe of the prothorax broader than long.

Location of types: Described from good series taken in Douglas Co., Kansas. Holotype, allotype and paratypes in Francis Huntington Snow Collections, University of Kansas, Lawrence, Kansas.

Data on distribution: (Plate LXXXII.) The published records include Washington State, Kansas, South Dakota, Minnesota, Michigan, Ohio, New York and Maine in the United States, and Ontario and Quebec provinces in Canada. We have before us the following:

CANADA: *Quebec:* Montreal, 1896, Appa (Kirkaldy Coll.), 1 male, 1 female; Montreal Island, May 30, 1903 (Wash. U. Coll.), 1 male; Ile Jesus, Sept. 24, 1932 (record by G. S. Walley); Ile de Montreal, Beaulieu, May 21, 1903.

New Brunswick: St. Croix R., Oct. 23, 1893, W. C. Kendall.

Ontario: Ottawa, J. I. Beaulne, Oct. 26, 1913; Toronto, Nov. 21, 1931, E. C. Oakley, 1 male.

Manitoba: Winnipeg, June 12, 1910, J. B. Wallis (Wallis Coll.), 1 male, 1 female; Stony Mts., May 28, 1910, J. B. Wallis (Wallis Coll.), 2 females; Russell, Aug. 1, 1937, C. L. Johnston, 1 male; Aweme, Oct. 11, 1916, N. Criddle.

Alberta: MacLeod, Sept. 15, 1928, Owen Bryant (Bryant).

British Columbia: Cranbrook, Sept. 17, 1928, Owen Bryant (Bryant); Oliver, Aug. 6, 1931, L. D. Anderson, 1 male.

N. W. Terr.: E. P. Van Duzee.

U. S. A.: *Maine:* Orono, May 8, 1912, H. M. Parshley (Parshley Coll.) 3 males, 1 female; Peak's Isld., Aug. 3, 1927, G. A. Moore.

New Hampshire: Durham, Osborne Coll. 2 females (Parshley); Crawford, Sept. 23, 1916, H. M. Parshley (Parshley Coll.), 1 male; Star Lake, 1 male; Hampton, April 18, 1922, S. Albert Shaw; Center Ossippee, July 10, 1934, M. W. Sanderson, 1 male; New Haverhill, Aug. 21, 1934, P. A. McKinstry, 5 males, 7 females; Bath, Aug. 21, 1934, R. H. Beamer and P. McKinstry, 2 females; Carroll, summer 1934, N. H. Preble, 1 male.

Vermont: Winooski, Aug. 30, 1901 (Davis Coll.), 1 female.

Massachusetts: Farmingham, May 2, 1915, C. A. Frost, 1 female; Peru, Aug. 21, 1904, 2 males; Amherst, Aug. 26, 1904, 1 female (Parshley); Northampton, Sept. 17, 1931, K. L. Slingerland, 3 females; Melrose High, D. H. Clemons, 1 male; Massachusetts (Uhler Coll.), 1 female; Brooks, 1878 (Uhler Coll.), 1 male; Northampton, Oct. 31, 1917, H. M. Parshley (Parshley Coll.), 1 male; same place, Nov. 1, 1919, Priscilla Butler, 1 female; Forest Hills, 1915, H. M. Parshley (Parshley Coll.), 2 males, 4 females.

Rhode Island: Kingston, Nov. 11, 1909, 1 female; Rhode Island, 1 male.

Connecticut; New Haven, Aug. 23, 1934, P. McKinstry, 2 males; New Canaan, April 30, 1919, M. P. Zappe, 2 males, 3 females.

New York: Ashokan, 1 female, 1 male; Gowanda, Aug. 2-9, 1907, E. C. Van Dyke (Van Duzee); Essex Co., Aug. 2, 1895, 3 females;

Long Island, May, 1 male; Long Island, Queen's Village, Sept. 25, 1937, J. C. Lutz (Lutz); W. Shokan, July 30, 1909, 3 males; Carmel, Aug. 12, 1910, 1 female; Long Island, Cold Spring Harbor, July 26, 1920, Priscilla Butler (Hussey); Tompkins Cove, L. I., Aug. 10, 1910, 3 females; Bronx Park, N. Y., Sept., 1930, J. Torre-Bueno (Bueno Coll.), 6 males, 2 females; Ithaca, Nov. 19, 1921, H. B. Hungerford, 3 males, 15 females; Long Island, 1 male; Ithaca, Oct. 28, 1917, E. C. Van Dyke (Calif. Acad.); White Plains, Aug. 13, 1907, 2 males, 1 female; same place, Sept. 13, 1919, R. F. Hussey (Parshley); Tompkins Co., July 8, 1919, McLean, 2 females; Lone Lake, Aug. 19, 1909, 1 male; Sodas Bay; White Plains, Sept. 13, 1919, Torre-Bueno (Bueno Coll.), 1 female.

New Jersey: Ramsey, Sept. 19, 1909, 3 males, 3 females; Trenton, Oct., 1930, J. Torre-Bueno (Bueno Coll.), 1 female; Rancoca, Aug. 29, 1937, E. M. Becton, 1 male; Paterson, Sept., 1901, 1 female; Iona, July 27, 1941, J. C. Lutz (Lutz).

Pennsylvania: Pine Grove Mills, July 22, 1942, V. R. Haber, 1 female; Barrens, Aug. 5, 1942, V. R. Haber, 1 female; State College, summer 1930, Casselberry, 6 females; Pittsburgh, H. G. Klages, 1 female.

Washington, D. C.: D. H. Clemons, 1 male, 1 female.

Virginia: Virginia Beach, Aug. 11, 1934, M. E. Griffith, 1 female; Norfolk, Aug. 11, 1934, P. McKinstry, 1 female.

North Carolina: C. V. Riley, 1 female.

Georgia: Okefenokee Swamp.

Mississippi: Agricultural College. Aug. 20, 1913, J. G. Hester (Miss. Coll.), 1 male, 5 females.

Texas: (C. V. Riley Coll.)

Kansas: Douglas Co., Oct. 28, 1921, Robert Guntert, 2 males, 3 females; Douglas Co., 900 ft., May 6, 1911, F. X. Williams, 1 female; Douglas Co., Stubbs Pond, April 8, 1921, H. B. Hungerford, 2 females; same place and collector, Nov. 27, 1922, 2 females; Douglas Co., Feb. 15, 1921, H. B. Hungerford, 13 males, 19 females; Douglas Co., Sept. 28, 1921, Robert Guntert, 7 males, 13 females; Atchison Co., July 11, 1924, E. P. Breakey, 1 male; Wathena, Aug. 4, 1904, W. Mann (Parshley); Onaga, 1 male; Cowley Co., Feb. 23, 1921, W. E. Hoffmann, 1 female; Pratt Co., April 12, 1925, R. H. Beamer, 1 male; Decatur Co., 2,560 ft., F. X. Williams, 1 female; Scott Co., June 21, 1925, R. H. Beamer, 3 males, 3 females; Wichita Co., 3,300 ft., F. X. Williams, 2 females; Logan Co., Sept. 22, 1925,

R. H. Beamer, 1 male, 2 females; same place, 3,322 ft., F. X. Williams, 1 female; Thomas Co., F. X. Williams, 1 male.

Illinois: Palos Park, Sept. 12, 1908, W. J. Gerhard (Field Mus.), 2 males; Chicago, Sept. 12, 1908, W. J. Gerhard (Field Mus.), 1 male; Evanston, Sept. 23, 1904, E. Liljeblad (Mich. Coll.), 4 males, 5 females; northern Illinois, Ashmead, 1 female (det. by Uhl. as *harrisii*); Urbana, H. Kahl (Carn.), 2 males, 4 females; Edgebrook, Nov. 7, 1903, W. J. Gerhard (Parshley); Chicago, April 10, 1904, A. B. Wolcott (Parshley); Urbana, Nov. 9, 1911; Champaign, Nov. 12, 1927, A. T. McClay (Usinger); Havana, April 20, 1895, Hart and Newberry (Ill. Nat. Hist. Surv.); Morgan Co., June 14, 1898, F. M. McE. (Drake).

Indiana: Miller, Aug. 24, 1918, W J Gerhard (Field Mus. Coll.), 1 female; Clark Junction, Aug. 1, 1904, W. J. Gerhard (Field Mus.), 1 female; Dune Park, Aug. 2, 1904 (Field Mus.), 2 females; Clark Junction, Aug. 7, 1904, W. J. Gerhard (Field Mus.), 3 males, 6 females.

Ohio: Columbus, July 9, 1930, C. H. Hicks (Lutz); Ira, Summit Co., Aug. 31, 1916, C. J. Drake (Drake), 3 males, 4 females; Berea, Dec. 19, 1911, 1 female (Drake); Tiffin, Aug. 26, 1916, C. J. Drake (Drake), 2 females

Michigan: Washtenaw Co., Oct. 30, 1917, R. F. Hussey (Hussey Coll.), 10 males, 13 females; Berrien Co., Sept. 2, 1919, R. F. Hussey (Hussey Coll.), 1 male, 2 females; Washtenaw Co., Nov. 10, 1918, P. Butler (Hussey Coll.), 2 males, 3 females; same place, March 30, 1918, R. F. Hussey (Hussey Coll.), 2 males, 7 females; same place, March 31, 1933, 2 females; same place, Oct. 5, 1918 (Mich Coll.), 7 males, 10 females; same place, Sept. 26, 1914, F. M. Gaige (Mich. Coll.), 1 male, 6 females; same place, Ann Arbor, May 25, 1918, F. M. Gaige (Mich. Coll.), 4 males, 11 females; same place, March 30, 1920, T. H. Hubbell (Mich.), 2 males, 2 females; same place, April 20, 1917 (Mich. Coll.), 3 males, 2 females; same place, Oct. 5, 1916 (Mich. Coll.), 2 females; Washtenaw Co., April 21, 1933 (Mich. Coll.), 1 male, 4 females; same place, Ann Arbor, June 28, 1921, T. H. Hubbell (Mich.), 1 male, 3 females; Ann Arbor, Nov. 3, 1917 (Mich. Coll.), 3 females; same place, July 11, 1901 (Mich. Coll.), 4 males, 8 females; same place, E. H. Frothingham (Mich. Coll.), 1 male, 1 female; same place, Miss Haynes (Mich. Coll.), 3 males, 3 females; same place, Oct., 1916 (Mich Coll.), 1 male, 3 females; same place, March 7, 1894, Wolcott (Nebr. Coll.), 3 males, 1 female; Berrien Co., July 4, 1919, R. F. Hussey (Hussey Coll.), 1 female; Ann Arbor, June, 1921, R. F. Hussey (Hussey Coll.), 11 males, 9 females; Livingstone Co., Aug. 10, 1919, same collector (Hussey Coll.), 2 males, 2 females; same place, Lakeland, same date and collector (Mich.), 1 female; Battle Creek, Aug. 26, 1920, P. Butler (Hussey Coll.), 6 males; same place and collector, Aug. 22, 1920 (Hussey Coll.), 20 males, 35 females; Ostego Co., State Park, Aug. 14, 1930, G. Cooper (Mich. Coll.), 1 male, 1 female; Jackson Co., April 23, 1933 (Mich. Coll.), 1 female; Cheboygan Co., Aug. 3, 1917, R. F. Hussey, 10 males, 20 females (Mich. Coll.); same place and collector, 1918 (Hussey Coll.), 4 males, 4 females; same place, July 11, 1938, H. B. Hungerford, 2 males, 4 females; same place and collector, Aug. 7, 1930, 12 females; Burt Lake, July 7, 1923, same collector, 2 males, 6 females; Bois Blanc Island, Aug. 14, 1932, same collector, 4 females; North Michigan, Aug. 23, 1930, same collector, 2 females; Pellston Road Pool, 1930, same collector, 6 females; Nichol's Pond, Doug. L., July 22, 1929, same collector, 2 females; Douglas Lake, July 27, 1924, same collector, 5 males, 1 female; Douglas Lake, Sedge Pool, July 3-6, 1923, same collector, 20 males, 48 females; Douglas Lake, Bryant's Bog, July 17, 1923, same collector, 11 males, 11 females; Douglas Lake, Mud Lake, July 31, 1923, same collector, 2 males, 5 females; Douglas Lake, Bessey Creek, July 18, 1923, same collector, 1 female; Douglas Lake, Beach Drift, Aug. 3, 1923, same collector, 1 female; Douglas Lake, Smith's Bog, Aug. 8, 1923, same collector, 1 male, 2 females; Druid Hill (Uhler Coll.), 1 female; Taquamenon R., Luce Co., May 20, 1925, J. Metzelaar (Mich.), 1 male, 3 females; Mason Co., March 27, 1925, same collector (Mich.), 1 female; Grand R., Kent Co., March 21, 1925, same collector (Mich.), 1 female; Lenawee Co., Tiffin R., Nov. 15, 1925, C. L. Hubbs (Mich.), 1 female; Grand Traverse Co., Boardman's R., May 13, 1925, J. Metzelaar (Mich.), 1 male; Leighton Swamp, Allegan Co., March 10, 1925, same collector (Mich.), 4 males, 6 females; S. Haven, Aug. 4, W. J. Gerhard (Parshley).

Wisconsin: St. Croix R., Aug. 17, 1928, Schultz and Tarzwell (Mich.), 8 males, 5 females; (Bueno Coll.), 1 female; (C. F. Baker in U. S. N. M.); Dane Co., March 16, 1930, E. P. Breakey, 13 females; Madison, August (Drake); Dane Co., April 19, 1930, E. P. Breakey, 1 male, 6 females; Brule, Aug. 16, 1937, C. L. Johnston, 1 male, 2 females; Beaver Dam, March 21, 1910, W. E. Snyder (Parshley).

Minnesota: St. Paul, July 28-31, 1921, H. B. Hungerford, 59 males, 33 females; same place and collector, July 11, 1921, 2 males, 4 females; same place, July, 1934, C. L. Granovsky, 4 males, 3 females; same place, Sept. 22, 1919, R. F. Hussey (Hussey Coll.), 6 males, 7 females; same place and collector, Sept. 8, 1918 (Mich. Coll.), 1 female; same place, Como Park Greenhouse, Aug. 16, 1921, Wm. E. Hoffmann (Minn. Coll.), 1 male, 1 female; same place, 1926, C. Mohr (Minn. Coll.); St. Paul, Hussey's Pool, Aug. 7, 1921, W. E. Hoffmann (Minn.), 2 males, 6 females; St. Paul, L. Johanna, Sept. 24, 1921, same collector (Minn.), 1 male; Minneapolis, Univ. campus, Aug. 17, 1921, W. E. Hoffmann (Minn.), 1 female; same place, April, 1907, R. A. Vickery (Nat. Mus.), 1 female; same place, Sept. 11, 1919, R. F. Hussey (Hussey Coll.), 7 males, 2 females; Rochester, July 16, 1921, H. B. Hungerford, 1 male, 5 females; Becker Co., Shell L., Aug. 22, 1922, same collector, 6 females; Bengal, Aug. 18, 1922, same collector, 2 males; Two Harbors, Aug. 9, 1922, same collector, 1 female; Carlson, Aug. 8, 1922, same collector, 1 female; Pine River, Big Trout Lake, Aug. 26, 1939, H. E. Severin (S. Dak.); Washington Co., May 15, 1917 (Lutz); Pelican Rapids, Aug. 22, 1922, H. B. Hungerford, 6 males, 11 females; Lake Co., Stony River Camp No. 9, Aug. 15, 1922, same collector, 1 female; St. Louis Co., Aug. 14, 1922, same collector, 3 males, 7 females; Eveleth, Aug. 13, 1937, C. L. Johnston, 2 males, 2 females; Bird's Island, Aug. 25, 1921, W. E. Hoffmann (Minn. Coll.), 1 male, 1 female; Itasca Park, Aug. 21, 1922, H. B. Hungerford, 1 male; Minnehaha Creek, Hennepin Co., July 9, 1921, same collector, 2 females; Ramsey Co., April 20, 1933, D. Pletch, 2 females; (Uhler Coll.), 2 males.

Iowa: Mt. Pleasant, Nov. 3, 1927, S. R. Ewart (Lutz); same place, March 24, 1939, D. S. Millspaugh; Iowa, April 3, 1940, D. S. Millspaugh; Sioux City, C. N. Ainslee, 1 male; Iowa City, G. Severin, 1 male, 1 female.

North Dakota: Ramsey Co., L. Irvin, Aug. 21, 1922, T. L. Hankinson (Mich. Coll.), 7 males, 20 females; Ransom, Cheyenne R., Sept. 19, 1922, C. Thompson (Mich. Coll.), 4 males, 3 females; McVille, July 27, 1937, Beamer and Johnston, 7 males, 8 females; Northwood, July 27, 1937, H. T. Peters, 2 females; Sanborn, July 23, 1937, C. L. Johnston, 5 males, 8 females; Linton, July 23, 1937, H. T. Peters, 2 males, 3 females; L. Metagoshe, July 30, 1937, H. T. Peters, 1 female; Fargo, Sept. 29, 1918, O. A. Stevens, 1 female.

South Dakota: Miller, July 20, 1937, R. H. Beamer, 2 males, 3 females; Brookings, July 19, 1919, H. C. Severin, 1 female; Wasta, July 17, 1937, H. T. Peters, 2 males; Pierre, July 19, 1937, C. L. Johnston, 1 female; Bradley, July 21, 1937, R. H. Beamer, 2 males, 5 females; Woods, July 23, 1939, H. C. Severin (S. Dak.); Pickerel L., Sept. 14, 1939, same collector (S. Dak.); Victor, Dry Run L., Sept. 13, 1939, same collector (S. Dak.); Clear Lake, July 19, 1939, same collector (S. Dak.); Lake Traverse, Sept. 13, 1939, same collector (S. Dak.); Webster, Sept. 14, 1939, same collector (S. Dak.); Roslyn, same date and collector (S. Dak.); Waubay, Sept. 14, 1939, same collector (S. Dak.); Belvidere, Sept. 22, 1939, G. B. Spawn (S. Dak.); Chancellor, Dec. 8, 1939, same collector (S. Dak.); Chamberlain, Sept. 18, 1939, same collector (S. Dak.); Oak Lake, Aug. 22, 1939, Wynn Eakins (S. Dak.); Brookings Co., L. Oakwood, Aug. 11, 1939, H. C. Severin (S. Dak.); Ft. Pierre, July 20, 1939, same collector (S. Dak.); White River, July 23, 1939, same collector (S. Dak.); Ortley, Sept. 14, 1939, same collector (S. Dak.); Huron, Sept. 18, 1939, same collector (S. Dak.); Arlington, June 19, 1939, same collector (S. Dak.).

Nebraska: Lincoln (Nebr. Coll.), 6 males, 10 females; same place, Nov. 12, 1925, Owen Bryant (Bryant).

Montana: Drummond, Aug. 11, 1931, L. D. Anderson, 1 male; Rapeke, Sept. 14, 1928, 1 female.

Washington: Mason Co., L. Cushman, Aug. 3, 1919, P. Putnam (U. S N. M.), 5 males, 3 females

Oregon: North Powder, July 13, 1931, L. D. Anderson, 1 male; Florence, July 11, 1935, R H. Beamer, 2 males, 1 female.

California: Idyllwild, Aug. 3. 1935, Jack Beamer, 1 female.

Hesperocorixa georgiensis (Egbert)

(Plate LXXX, figs 5, 5a-5b)

1946 *Anticorixa georgiensis* Egbert, A M Jl Kans Ent Soc XIX, No 4, pp 133-135, 1 plate

Size: Length 8.8 mm. Width of head across eyes 3.2 mm.

Color: General facies rather dark. Pronotum crossed by 8 or 9 dark, regular bands which are interrupted along the center beyond the pronotal keel by a narrow yellow stripe. Pale figures of clavus almost coalescing basally; dark figures tending to merge along margins. Corium with dark figures broad, transverse, irregular; black patch at distal end of embolium and at inner distal angle of corium; outer distal angle with V-shaped patch of pale yellow. Membrane separated from corium by pale brown line, and with paler pattern, except outer border which has blackish patch. Venter and limbs pale yellow.

Structural characteristics: Head of male, when viewed from above, a little more than half the length of the pronotal disk; the frontal arch very slightly produced. Facial impression of male slight, not reaching middle of eyes; facial hairs sparse. Antennal segments: 1 : 2 : 3 : 4 :: 30 : 21 : 60 : 35 ♂. Pronotal disk with faint median keel on anterior margin; disk somewhat pointed at apex. Dorsal surface of insect shiny, the pronotum finely rastrate, the clavus rastrate only along the hemelytral suture, rugulose at base, the corium very finely rastrate. Hemelytra with very few hairs. Pruinose area of embolar groove posterior to nodal furrow about one-third the length of the embolium. Lateral lobe of the prothorax plainly longer than broad, tip truncate. Mesoepimeron narrow, the osteole of the scent gland close to tip. Metaxyphus arrow-shaped, longer than broad.

Front leg of male: Pala sub-parallel-sided with distal margin almost straight; about 23 teeth, of which those at either end are smaller than those in middle, basal carina present but not prominent; tibia two-thirds as long as pala with dorsal carina bearing cluster of about three spines at distal end; femur relatively stout with about 8 or 9 rows of stridulatory teeth at base of inner surface. Middle and hind legs of moderate size; hind leg with tibia slightly longer than the femur; the proportions of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 46.4 : 37.1 : 35.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 102 : 122.4 : 32.6. Male asymmetry dextral; strigil very long, reaching from posterior margin of segment 5 almost to the posterior margin of segment 7, and having 10 rows of fairly regular combs. For details of male structures see Plate LXXX, figs. 5, 5a and 5b.

Comparative notes: This species is nearest in general appearance to *laevigata* (Uhl.), from which it differs in having a nonreticulate hemelytral pattern and a clearly defined membranal suture. It differs from *lucida* (Abbott), which it also somewhat resembles, in being almost without rastration, in having a complete corial pattern, and in having the tibia of the hind leg slightly longer than the femur.

Location of types: Described from one male labeled "Baker Co., Georgia, Oct. 23, 1927, C. H. Martin." Holotype in Francis Huntington Snow Collections, University of Kansas, Lawrence, Kansas.

Data on distribution: (Plate LXXXIV.) Known only by the type.

Hesperocorixa nitida (Fieber)

(Plate LXXX, figs. 3, 3a-3b)

1851. *Corisa nitida* Fieber, F. X. Species Generis Corisa, p. 28, Pl. II, fig. 8 (desc. from North Carolina in Germar coll.).

1909. *Arctocorisa nitida*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 196.

1913 *Arctocorisa nitida*, Abbott, J. F. Bull. Brooklyn Ent. Soc. VIII, p. 82 (records Spring Creek and Okefenokee Swamp, Ga.).

1914. *Arctocorixa nitida*, Parshley, H. M. Psyche XXI, No. 5, p. 140 (from Orono, Me.). (This is *H. atopodonta* Hungfd.)

1915. *Arctocorisa nitida*, Abbott, J. F. Washington Univ. Studies II, p. 81 (Billy's Isl. in Okefenokee Swamp, Ga.)

1917. *Arctocorisa nitida*, Parshley, H. M. Occas. Papers of the Boston Soc. of Nat. Hist., VII, p. 117.

1917. *Arctocorixa nitida*, Van Duzee, E. P. Catalogue of Hemiptera . , p. 482.

1923. *Arctocorisa nitida*, Abbott, J. F. The Hemiptera or Sucking Lice of Connecticut, p. 389, fig. 36—No. 6 *in* Bull. Geol. Nat. Hist. Surv. Hartford, Conn. XXXIV (records New England).

1926 *Arctocorixa nitida*, Blatchley, W. S. Heteroptera of Eastern North America, pp. 1068 and 1070, Pl. XII, fig. 6 (records Staten Isl., N. Y. and Indiana).

1928. *Arctocorixa nitida*, Torre-Bueno, J. R. de la. A List of the Insects of New York, p. 141, *in* Cornell Univ. Agri. Exp. Sta. Memoir 101.

1928. *Arctocorixa nitida*, Hungerford, H. B. Ent. News XXXIX, p. 156 (records Baker Co., Ga.).

1929. *Sigara nitida*, Lundblad, O. Archiv. fur Hydrobiologie, XX, pp. 300-303, figs. 4-8, Pl. X, fig. 1 (examined type)

1931. *Sigara nitida*, Lundblad, O. Zool. Anzeiger, XCVI, Heft 3-4, pp. 85-95 (specimen in Halle "Nordamer. Leg. Zimmerman." ♂).

1933 *Arctocorixa nitida*, Fattig, P. W. Ent. News XLIV, p. 152 (falling on auto in Ga., det. by H. G. Barber).

1936. *Sigara (Anticorixa) nitida*, Jaczewski, T. Proc. Royal Ent. Soc. London V, Pt. 2, Ser. B, p. 42.

1938. *Arctocorixa nitida*, Brimley, C. S. Insects of North Carolina, p. 84.

Size: Length 8 mm. to 9 mm. Width of head across eyes 2.7 mm. to 3.1 mm.

Color: General facies dark. Head, limbs, and venter yellow. Pronotum with about 9 broad, regular, dark bands. Claval pattern in more or less regular transverse series, the dark bands broader than pale ones, and growing irregular distally. Pattern of corium irregular and broken though still in more or less transverse series. Dark areas tending to merge at inner apical angle of corium. Pattern of membrane slightly more broken than that of corium; not separated from corium, except indistinctly in occasional specimens by fusion of pale lineations. Embolium smoky.

Structural characteristics: Head about one-third as long as pronotal disk; vertex rounded; facial hairs few; male fovea ovate, fairly shallow, not attaining eyes laterally. Antennal segmentation: 1 : 2 : 3 : 4 :: 27 : 18 : 60 : 30 males; 1 : 2 : 3 : 4 :: 24 : 20 : 55 : 30

females. Pronotal disk with faint indication of median carina on anterior margin; apex somewhat pointed. Pronotum and hemelytra finely rastrate, membrane shining. A few long, pale hairs on hemelytra.

Lateral lobe of prothorax a little longer than broad, quadrate, apex rounded slightly. Mesoepimeron narrow, the osteole near the tip. Metaxyphus arrow-shaped, a little longer than broad.

Front leg of male: Pala elongate with sides nearly parallel, upper apical margin slightly produced but rounded; about 22 teeth in peg row; basal carina prominent; tibia with short dorsal carina bearing tuft of about 4 short spines distally; femur slender, without patch of stridulatory teeth on inner surface. Middle and hind legs relatively slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 41.8 : 33 : 39.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 96.1 : 125.4 : 48.1. Male asymmetry dextral. Strigil small, sides parallel, ends rounded, with about 8 regular combs. For details of male structures see Plate LXXX, figs. 3-3b.

Comparative notes: This species is nearest to *H. interrupta* (Say) from which it differs in its smaller size and in having a row of about 10 spines on the distal portion of the rear margin of the hind femora.

Location of types: The type material studied by Fieber in Berlin Museum and in Halle, Germany. Studied by O. Lundblad and by me.

Data on distribution: (Plate LXXXIII.) The published records are Maine, Maryland, North Carolina, Georgia, New York and Indiana. The Maine record was based on a misdetermination. We have seen the following:

U. S. A.: *New York:* Long Island, H. Muske, 1 female; Long Island, May, 1 male; Buffalo (E. P. Van Duzee Coll.), 1 male; Flatbush, L. I., April 12, 1890, 1 female.

Massachusetts: Melrose High, D. H. Clemons, 1 male; Massachusetts, F. Blanchard, 2 females.

Rhode Island: 1 male (Abbott Coll.).

Pennsylvania: Barrens, Aug. 5, 1942, V. R. Haber, 2 males, 2 females; Philadelphia, April 1, 1938, J. C. Lutz (Lutz Coll.), 1 male.

Maryland: Plummer's Island, Aug. 15, 1913, Barber (Barber Coll.), 1 male; Maryland, Oct. 6 (U. S. N. M.), 2 females.

Virginia: Great Falls, May 16, 1920, Priscilla Butler, 2 females.

Washington, D. C.: D. H. Clemons, 2 males; Rock Creek (Uhler Coll.), 1 male; Potomac R., in pot holes, Oct. 17, 1940, J. A. Fowler (U. S. N. M.), 4 females.

North Carolina: C. V. Riley, 1 male; Raleigh, December (Abbott Coll.); Halifax, Feb. 3, 1913 (U. S. N. M.), 1 female; Raleigh, Oct. 11, 1915, R. H. Leiby, 5 males, 3 females; Fuguay Spring, June 22, 1911, 2 males, 1 female; Southern Pines, June 19, 1915, H. M. Parshley (Parshley), 1 male; Southern Pines, 1915, A. H. Manee, 2 males, 2 females (U. S. N. M.).

South Carolina: South Carolina (Uhler Coll.), 1 male; Bennettsville, Nov. 17, 1931, O. L. Cartwright (S. C. Exp. Sta.), 1 male.

Georgia: Charlton Co., Camp Pinckney, June 22, 1922, A. H. W. and M. D. P., 3 males, 2 females; Charlton Co., Saddlebag Pond, June 30, 1922, M. D. Pirnie, 1 male; Johnson Co., Sept. 5, 1929, Creaser and Becker, 2 males, 8 females; Houston Co., Sept. 4, 1929, Creaser and Becker, 1 male, 5 females; Baker Co., Oct. 23, 1927, C. H. Martin, 10 males, 44 females; Baker Co., Dec. 23, 1946, L. W. Morgan, 6 males, 15 females; Albany, Oct. 27, 1927, C. H. Martin, 1 male, 3 females; Decatur, Spring Cr., July 16, 1912 (Cornell U. Coll.), 6 males, 2 females; Okefenokee Swamp, July 27, 1939, J. D. Beamer, 1 male, 1 female; Prattsburg, July 25, 1930, R. H. Beamer, 2 males, 2 females; Wrens, Aug. 22, 1930, P. W. Oman, 8 males, 11 females.

Florida: Gainesville, Dec. 14, 1937, H. B. Hungerford, 1 male.

Alabama: Crawford, July 24, 1930, P. W. Oman, 12 males, 8 females; Mt. Springs, July 21, 1930, R. H. Beamer and L. D. Tuthill, 6 males and 11 females; Montgomery, July 7, 1939, J. D. Beamer, 1 female.

Mississippi: Vicksburg, July 19, 1921, C. J. Drake (Drake Coll.), 3 males, 1 female; Lauderdale, July 17, 1930, R. H. Beamer, 1 male, 2 females; Hamilton, July 15, 1930, P. W. Oman, 3 males, 3 females; Beaumont, April 19, 1932, H. Dietrich, 1 male, 2 females; Iuka, July 14, 1930, P. W. Oman, 1 male.

Tennessee: Fentress Co., Allardt, Aug. 17, 1922, T. H. Hubbell (Mich. Coll.), 1 female; Murfreesboro, Aug. 29, 1929, Creaser and Becker, 1 male; Perryville, July 20, 1926, T. E. White, 1 male.

Ohio: Ohio (Uhler Coll.), 1 female.

Indiana: Indiana (Abbott Coll.).

Michigan: Druid's Hill (Uhler Coll.), 1 male.

Illinois: Illinois (Uhler Coll.), 1 female; Farina, W. E. Snyder; Olive Branch, Oct. 8, 1909, Gerhard (Field Mus. Coll.), 4 males, 9 females.

Minnesota: Minnesota (Bueno Coll.), 1 female.

Iowa: Iowa (Uhler Coll.), 2 females.

Missouri: St. Louis, 2 mi. west, June 10, 1904, W. V. Warner, 1 female.

Louisiana: Mound, Sept. 26, 1918, 2 males, 1 female; Opelousas Pilate (Uhler Coll.), 1 male, 1 female; Louisiana, C. F. Baker, 2 males, 1 female.

Texas: Bowie Co., Aug. 20, 1928, R. H. Beamer, 1 male; Woods Co., Feb. 5, 1939, D. S. Millspaugh; Athens, Dec. 5, 1938, D. S. Millspaugh.

Kansas: Cherokee Co., Aug., 1920, Hungerford and Beamer, 1 male, 1 female.

Hesperocorixa martini (Hungerford)

(Plate LXXXI, figs. 7, 7a-7b)

1928. *Arctocorixa martini* Hungerford, H. B. Ent. News XXXIX, p. 157 (desc. from Georgia).

1936. *Sigara* (*Anticorixa*) *martini*, Jaczewski, T. Proc. Royal Ent. Soc London, Ser B, Vol. V, Pt 2, p. 42.

Size: Length 8.7 mm. to 10.2 mm. Width of head across eyes 3.3 mm. to 3.9 mm.

Color: General facies dark. Pronotum crossed by 9 to 10 irregular dark bands. Clavus with dark bands much broader than pale lineations and forming regular series. Dark bands of corium not quite so broad as on clavus; pale lineations in regular series anterior to tip of claval suture, more broken and irregular thereafter. Membrane smoky with pattern obscure; indistinctly separated from corium by fusion of pale lineations; in some cases not separated at all. Embolium smoky.

Structural characteristics: Head slightly less than half as long as pronotal disk; vertex slightly produced in both sexes; facial hairs few; male fovea large, ovate, and deeply concave, attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 35 : 22 : 60 : 35 ♂; 1 : 2 : 3 : 4 :: 35 : 27 : 60 : 40 ♀. Pronotal disk with carina faintly indicated on anterior margin; apex somewhat pointed. Pronotum and hemelytra heavily rastrate, membrane shining. Hemelytra with a few long, pale hairs. Lateral lobe of prothorax quadrate. the end truncate. Mesoepimeron very slender, the scent gland osteole near tip. Metaxyphus as broad as long; arrow-shaped. Thorax, as seen in lateral view, somewhat elevated.

Front leg of male: Pala long, the sides almost parallel, rounded distally, about 30 pegs, larger at base, and smaller and more crowded distally, basal carina fairly prominent; tibia with tuft of four or five spines distally on dorsal carina; femur fairly slender, with about 7 rows of stridulatory teeth on inner surface near center. Middle and hind legs rather stout, the middle femora stout and spinose; segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 44.1 : 35.3 : 38.2; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 93.5 : 120.2 : 41.8. Male asymmetry dextral. Strigil elongate, of moderate size, with 10 regular combs. Right clasper of male genital capsule stout and turns transversely across capsule. For details of male structures see Plate LXXXI, figs. 7, 7a and 7b.

Comparative notes: This species closely resembles *H. obliqua* (Hungfd.) from which it differs in the shape of the pronotal disk, in having the metaxyphus as broad as long, and in having the frontal depression of the male large and concave.

Location of types: Described from 47 specimens taken by C. H. Martin in Baker Co., Georgia, Oct. 23, 1927. Holotype, allotype and paratypes in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate LXXXIV.) Besides the type series we have the following: Houston Co., Ga., Sept. 4, 1929, Creaser and Becker, 5 males, 6 females; Plant City, Fla., Jan. 4, 1927, C. O. Bare, 1 female.

Hesperocorixa obliqua (Hungerford)

(Plate LXXXI, figs. 5, 5a-5b)

1925. *Arctocorixa obliqua* Hungerford, H B. Bull. Brooklyn Ent Soc., XX, pp 142-143, Pl. VI, figs. 3 and 4. (Desc. from Kansas and records Texas, Oklahoma, Missouri, Iowa, Minnesota, Illinois, New York and New Jersey.)

1926. *Arctocorixa obliqua*, Blatchley, W. S. Heteroptera of Eastern North America, pp. 1069, 1070-1071, fig. 215, b (records Indiana).

1928. *Arctocorixa obliqua*, Hungerford, H B. Annals Ent. Soc. Amer XXI, p 144, Pl. VIII, fig. 12 (ventral view of male).

1928. *Arctocorixa obliqua*, Torre-Bueno, J. R. de la. A List of Insects of New York, p. 141 *in* Cornell Univ. Agri. Exp. Sta. Memoir 101.

1936. *Arctocorixa obliqua*, Walley, G. S. Can Ent. LXVIII, p. 60 (Records Eastern Panhandle, West Virginia, Iowa.)

1936. *Sigara* (*Anticorixa*) *obliqua*, Jaczewski, T. Proc. Royal Ent Soc. London, Ser. B, V, Pt. 2, p. 42.

Size: Length 10.1 mm. to 11 mm. Width of head across eyes 3.4 mm. to 3.6 mm.

Color: General facies dark. Pronotum with about 12 narrow black bands, somewhat broken posteriorly. Dark bands of clavus narrower at base than pale areas, but broader distally, in transverse series, but somewhat irregular and broken. Pattern of corium wavy and broken throughout; lines somewhat transverse but very irregular. Pattern of membrane continuous with that of corium. Embolium smoky to black. Head, limbs, and venter yellow to reddish brown.

Structural characteristics: Head about one-third length of pronotal disk; vertex rounded; facial hairs few; male fovea concave, ovate, not attaining eyes laterally. Antennal segmentation: 1 : 2 : 3 : 4 :: 28 : 22 : 60 : 41 ♂ ; 1 : 2 : 3 : 4 :: 28 : 22 : 57 : 42 ♀ . Pronotal disk with faint indication of median carina on anterior margin, apex somewhat pointed. Pronotum and hemelytra plainly rastrate, membrane shining. Lateral lobe of prothorax quadrate, no longer than broad. Mesoepimeron narrow, the osteole near the tip. Metaxyphus arrow-shaped, plainly longer than broad.

Front leg of male: Pala elongate, sides almost parallel, with distal end obliquely produced, twenty-four to twenty-five pegs, basal carina not prominent; tibia with dorsal carina bearing tuft of 4 to 5 short spines distally; femur moderately slender, without stridulatory pegs on inner surface. Middle and hind legs slender throughout, the segmental proportions being as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 42 : 34 : 40. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 93.1 : 116.4 : 39.4. Male asymmetry dextral. Strigil fairly large, long, of about eleven regular combs. For details of male structures see Plate LXXXI, figs. 5 to 5b.

Comparative notes: The obliquely produced male pala will serve to distinguish the males of this species. It is most closely related to *martini* (Hungfd.) from which it differs in having the metaxyphus longer than broad, and in not having a stout, spinose hind femur.

Location of types: Described from 218 specimens from Douglas Co., Kansas. Holotype, allotype and many paratypes in Francis Huntington Snow Collections, University of Kansas. Other paratypes in the U. S. National Museum, University of Minnesota, Cornell University, Carnegie Museum, and the private collections of J. R. de la Torre-Bueno, H. M. Parshley, R. F. Hussey, C. J. Drake and H. G. Barber.

Data on distribution: (Plate LXXXII.) The published records include Kansas, Texas, Oklahoma, Missouri, Iowa, Minnesota, Illinois, Indiana, New York, New Jersey and West Virginia. We have studied the following:

ALASKA: Noorvik, Kobuk River, Aug. 6, 1925, Mrs. S. Chance, 1 female.

U. S. A.: *New York:* Long Island (Bueno Coll.), 3 females; Staten Island (Bueno Coll.), 1 female; Bronx Park, N. Y., Sept., 1930, Torre-Bueno (Bueno Coll.), 1 male, 2 females; Ithaca, 1 male; Cold Spring Harbor, L. I., July 26, 1920, Priscilla Butler (Hussey); Van Cortlandt Park, Feb. 5, 1903, 1 male; New York City, 1 male; Staten Island, Nov. 8, 1903 (Wash. U. Coll.), 2 females.

Massachusetts: Woods Hole (Wash. U. Coll.), 1 female; Wellesley, April, 1891 (Uhler Coll.), 1 female.

New Jersey: Lake Forest, J. G. Needham, 10 males, 6 females; Palisades, Sept. 7, 1903 (Wash. U. Coll.), 1 female.

Pennsylvania: Barrens, Aug. 5, 1942, V. R. Haber, 4 females; State College, summer 1930, R. D. Casselberry, 2 males, 1 female; Pine Grove Mills, July 26, 1942, V. R. Haber, 2 males; Philadelphia, July 8, 1928, J. C. Lutz (Lutz Coll.), 4 males, 5 females.

West Virginia: Morgantown, Aug., 1923, 1 male, 3 females; Eastern Panhandle, Sept. 5, 2 males, 1 female.

Ohio: Portsmouth, Aug. 27, 1915, C. J. Drake (Drake), 1 male.

Illinois: Lake Forest, Girn Pond, Oct. 7, 1901 (Wash U. Coll.), 1 female; Chicago, C. T. Brues, 1 male (Parshley).

Tennessee: Murfreesboro, Aug. 29, 1929, Creaser and Becker, 3 males, 25 females.

Indiana: Kosciusko Co., May 2, 1932, G. E. Gould, 1 male.

Michigan: Michigan (Uhler Coll.), 1 male; Washtenaw Co., Ann Arbor, April 5, 1917 (Mich. Coll.), 1 male, 1 female.

Minnesota: Becker Co., Shell Lake, Aug. 22, 1922, H. B. Hungerford, 2 males; St. Louis Co., Aug. 14, 1922, H. B. Hungerford, 2 females; Minnesota (Bueno Coll.), 1 female.

Missouri: C. V. Riley Coll., 4 males, 7 females; Columbia, April 19, 1936, Wm. M. Gordon, 1 male, 4 females; Columbia, March, 1938, R. Froeschner (Mo. Coll.), 1 male, 1 female.

Mississippi: (Uhler Coll.) 1 female.

Arkansas: Hope, May 3, 1926, L. Knobel (Lutz).

Texas: Victoria, J. D. Mitchell (Nat. Mus.), 3 females; Texas (C. V. Riley Coll.); Colorado Co., May 2, 1922, G. O. Wiley, 1 female; Eastland Co., May 26, 1921, G. O. Wiley, 1 female;

Athens, Dec. 5, 1938, D. S. Millspaugh; (Uhler Coll.), 1 male, 1 female.

Oklahoma: Tulsa Co., March 21, 1922, G. O. Wiley, 2 males, 1 female.

Kansas: Green Co.? (Uhler Coll.), 3 males, 7 females; Cherokee Co., Aug. 1920, H. B. Hungerford, 5 males, 12 females; Scott Co., June 21, 1925, R. H. Beamer, 5 males, 13 females; Sherman Co., Aug. 1, 1925, R. H. Beamer, 1 male, 1 female; Morton Co., Aug. 3, 1924, C. O. Bare, 2 males, 3 females; Topeka, May 28, 1923, R. H. Beamer, 1 female; Douglas Co., Feb. 15, 1921, H. B. Hungerford, 2 females; Douglas Co., Sept. 28, 1921, Robert Guntert, 68 males, 82 females; Aug. 3, 1921, W. J. Brown, 2 males, 17 females; Douglas Co., April, 1923, R. H. Beamer, 1 male, 6 females; Douglas Co., March 26, 1923, H. B. Hungerford, 2 males, 1 female; Douglas Co., Stubbs' Pond, April 8, 1921, H. B. Hungerford, 3 males, 12 females; Logan Co., Sept. 22, 1925, R. H. Beamer, 2 males, 7 females; Scott Co., June 22, 1925, Howard Deay, 1 female; Coldwater, June 19, 1927, H. B. Hungerford, 1 male, 2 females.

Colorado: Mt. Zion Valley (Uhler Coll.), 1 female.

California: (Uhler Coll.), 1 male, 1 female (label questionable).

Hesperocorixa lobata (Hungerford)

(Plate LXXXI, figs 8, 8a-8c)

1925 *Arctocorixa lobata* Hungerford, H. B. Bull Brooklyn Ent. Soc, XX, p 143, Pl. VI, figs. 5 and 6 (desc. from Minn. and N. Y.).

1926 *Arctocorixa lobata,* Blatchley, W. S. Heteroptera of Eastern North America, p. 1069, 1071.

1928. *Arctocorixa lobata,* Torre-Bueno, J. R. de la. A List of the Insects of New York, p. 141 *in* Cornell Univ. Agri Exp. Sta Memoir 101.

1986. *Sigara (Anticorixa) lobata,* Jaczewski, T. Proc. Royal Ent. Soc. London, Ser. B, V, Pt. 2, p. 42.

Size: Length 9.4 mm. to 10.5 mm. Width of head across eyes 3.1 mm. to 3.2 mm.

Color: General facies medium brown. Head, limbs, and venter yellow. Pronotum crossed by about 8 regular dark bands. Dark lines of clavus fairly broad and regular. Pattern of corium more broken, the pale lineations short, more or less wavy and irregular in arrangement. Membrane in most specimens separated from corium by a fusion of the pale lineations; in a few cases there is no line of demarcation. Embolium yellowish white.

Structural characteristics: Head about one-third length of pronotal disk; facial hairs scanty; male fovea shallow, almost attaining eyes laterally; vertex not produced; antennal segmentation: 1 : 2 :

3 : 4 :: 31 : 20 : 60 : 40 males; 1 : 2 : 3 : 4 :: 31 : 22 : 65 : 35 females. Pronotal disk with faint indication of median carina on anterior margin; apex somewhat pointed. Pronotum and hemelytra strongly rastrate. Hairs on hemelytra few. Lateral lobe of prothorax quadrate, apex straight, no longer than broad. Mesoepimeron narrow, osteole near the tip. Metaxyphus arrow-shaped, a little longer than broad.

Front leg of male: Pala with sides subparallel, distal end almost truncate, with about 28 to 32 teeth in peg row, carina at base prominent; tibia with short dorsal carina bearing clump of 5 or 6 spines near distal end; femur relatively slender, with about 8 rows of stridulatory pegs on inner basal portion. Middle and hind legs slender, the segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 41.8 : 36.1 : 34.2; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.5 : 130.4 : 51.8. Male asymmetry dextral. Strigil moderately large, ovate, with about 14 fairly regular combs. For details of male structures see Plate LXXXI, figs. 8, 8a, 8b and 8c.

Comparative notes: The heavily rastrate pronotum and hemelytra and the fact that the membrane is usually plainly separated from the corium, plus the male characters listed above, will serve to distinguish this species.

Location of types: Holotype, allotype and four male paratypes labeled "St. Paul, Minn., Golf Club Pond, July 28, 1921, H. B. Hungerford"; two male paratypes labeled "St. Paul, Minn., Elk's Golf Ponds, July 11 and 14, 1921, H. B. Hungerford" and two male paratypes from Long Island, New York. All of these are in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate LXXXIV.) Besides the types we have seen the following:

U. S. A.: *Maine:* Orono, May 4, 1913, H. M. Parshley (Parshley Coll.), 1 male.

New Hampshire: Carroll, summer 1934, N. H. Peeble, 4 males, 1 female; Bath, Aug. 21, 1934, P. McKinstry, 1 male.

New York: Tompkins Co., Aug. 10, 1910 (Am. Mus. Nat. Hist.), 1 male; Nyack, Oct., 1896, 9 females.

Massachusetts: Melrose High, April 24, D. H. Clemons, 2 females; Springfield, G. Dimmock (U. S. N. M.), 1 female.

New Jersey: Ramsey, Sept. 19, 1909, 3 males, 7 females.

Rhode Island: Kingston, Nov. 11, 1909, 2 females.

Maryland: Cabin John, Aug. 4, 1944, R. I. Sailer (U. S. N. M.), 1 female.

Georgia: Houston Co., Sept. 4, 1929, Creaser and Becker, 1 male, 1 female.

Michigan: Douglas Lake, Bryant's Bog, Aug. 25, 1925, H. B. Hungerford, 14 males, 1 female; Agricultural Col. (Bueno Coll.), 1 female.

Wisconsin: Danc Co., L. Wingra, April 19, 1930, E. P. Breakey, 1 male, 1 female.

Minnesota: Itasca Park, Green L., Aug. 21, 1922, H. B. Hungerford, 4 males, 7 females; St. Louis Co., Aug. 14, 1922, H. B. Hungerford, 2 males, 3 females; Minnesota (Bueno Coll.), 2 females.

Hesperocorixa interrupta (Say)

(Plate LXXXI, figs. 1, 1a-1b)

1825. *Corixa interrupta* Say, Thomas. Jl. Acad. Nat. Sci. Phila. IV, p. 328-329; also Compl. writings ed. by LeConte II, p. 250 (desc. from Missouri).

1851. *Corisa interrupta*, Fieber, F. X Species Generis Corisa, p 27, Pl. II, fig 7 (In part, the North Amer. record but not Mexico or Brazil.)

1875. *Corisa interrupta*, Uhler, P. R. Wheeler's Surv. 100th Merid., V, p. 842. (Records Owen's Valley, Cal., and Lower Rio Grande. These are *C. laevigata* Uhler 1893.)

1876. *Corixa interrupta*, Uhler, P. R. Bull. U. S Geol. and Geog. Surv. of Territories, No. 5, Vol. 1, p. 340; also reprint separately paginated, p 74. (In part, the Missouri, Illinois, New England, New York, Maryland and Minnesota (?) but not California.)

1877. *Corixa interrupta*, Uhler, P. R. Bull. U. S. Geol. and Geog. Surv. of Territories, Vol. III, p. 454. (Reports "examples taken from Sloan's Lake on the highlands west of Denver in July by Doctor Packard and in August by myself.") I cannot find these specimens and question the determination. Probably *C laevigata* Uhler 1893.

1877. *Corixa interrupta*, Uhler, P. R. Wheeler's Rept. Chief Eng. for 1877, p. 1332.

1878. *Corisa interrupta*, Uhler, P. R. Bull. U. S. Geol. Geog. Surv., p. 509. (Milk River, Mont. This is *C. laevigata* Uhler 1893.)

1878. *Corisa interrupta*, Uhler, P. R. Proc. Boston Soc. Nat. Hist. XIX, p. 445. (No. 22 in Harris collection named by Mr. Say, a female correctly determined.)

1884. *Corisa interrupta*, Uhler, P. R. Stand. Nat. Hist. II, p. 250 (in part).

1895. *Corisa interrupta*, Gillette, C. P., and Baker, C. F Hemiptera of Colorado. Agri. Exp. Sta. Bull. 31, p. 64. (This is *C. laevigata* Uhler.)

1901. *Corixa interrupta*, Champion, G. C Biol Centr.-Amer. Rhynchota II, p. 376. (In part, but not the California, Mexican or Brazilian records.)

1909. *Arctocorisa interrupta*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 195. (In part, but not the Colorado, California, Mexican, Guatemalan or Brazilian records.)

1910. *Arctocorisa interrupta*, Smith, J. B. Insects in N. J., 3d ed., p. 168 *in* Report of N. J. State Museum for 1909.

1913. *Arctocorisa interrupta*, Abbott, J. F. Bull. Brooklyn Ent. Soc., VIII, p. 82. (Records Marietta, Ga. Evidently based on nymphs.)

1913. *Arctocorisa interrupta*, Abbott, J. F. Wash. Univ. Studies I, pp. 10-21, fig. 1A and Pl. iii. (From Nonamesset Island, Mass., a study in variation.) (In part.)

1914. *Arctocorisa interrupta*, Parshley, H. M. Psyche XXI, p. 140 (Orono, Me.). This is *H. vulgaris* Hungerford.

[illegible]7. *Arctocorisa interrupta*, Parshley, H. M. Occasional Papers of the Boston Soc. Nat. Hist. VII, p. 116.

1917. *Arctocorixa interrupta*, Van Duzee, E. P. Catalogue of Hemiptera . . . , p. 481 (in part).

1923. *Arctocorisa interrupta*, Abbott, J. F. The Hemiptera or Sucking Insects of Connecticut, pp. 387-389, fig. 86, 1, 5, 8, *in* Bull. Geol. Nat. Hist. Surv. Hartford, Conn. XXXIV. (Records Conn.).

1925. *Arctocorixa interrupta*, Hungerford, H. B. Bull. Brooklyn Ent Soc. XX, No. 3, pp. 141-144 [*A. harrisii* (Uhler) not a syn.].

1926. *Arctocorixa interrupta*, Blatchley, W. S. Heteroptera of Eastern North America, pp. 1068, 1069, Pl. XII, fig 5. (Records Indiana but Pacific record incorrect.)

1928. *Arctocorixa interrupta*, Hungerford, H. B Ent. News, XXXIX, p 156 (records Baker Co., Ga.).

1928. *Arctocorixa interrupta*, Torre-Bueno, J. R. de la. List of Insects of N. Y., p. 141, *in* Cornell Univ. Agri. Exp. Sta. Memoir 101.

1929. *Sigara interrupta*, Lundblad, O. Ent Tidskrift L Haft 1, pp. 27-29, fig. 6, 7a-h, Pl. III, fig. 8.

1931. *Sigara interrupta*, Lundblad, O. Zool. Anzeiger, XCVI, Heft 3-4, p. 86. (Zool. Mus. in Halle, "Nordamerika Leg Zimmerman," 1 ♂, 3 ♀ ♀.)

1936. *Sigara* (*Anticorixa*) *interrupta*, Jaczewski, T. Proc. Royal Ent Soc. London, Ser. B, Vol. V, Pt. 2, p 42.

1938. *Arctocorixa interrupta*, Brimley, C. S. Insects of North Carolina, p. 84.

1946. *Arctocorixa interrupta*, Proctor, Wm Biol Surv. Mt Desert Region Inc, Pt VII. The Insect Fauna, p. 82 (Bar Harbor, Maine)

Size: Length 9 mm. to 11 mm. Width of head across eyes 3 mm. to 3.4 mm.

Color: General facies dark. Head, limbs, and venter yellow. Pronotum crossed by 8 to 10 broad dark bands, somewhat irregular posteriorly. Clavus with broad dark bands in fairly regular series, interspersed with paler flecks. Dark bands of corium narrower and less regular. Membranal line indistinctly marked by coalescing of paler figures. Pattern of membrane slightly more broken than that of corium. Embolium silvery white.

Structural characteristics: Head about one-third the length of pronotal disk; facial hairs few; male fovea shallow, ovate, not attaining eyes laterally; vertex rounded; antennal segmentation: 1 : 2 : 3 : 4 :: 30 : 21 : 53 : 40 ♂ ; 1 : 2 : 3 : 4 :: 31 : 23 : 60 : 40 ♀. Pronotal disk with faint median keel on anterior margin; apex slightly pointed. Pronotum and hemelytra finely rastrate, membrane shining. Pruinose area of embolar groove posterior to nodal furrow about one-third the length of the embolium. Lateral lobe of prothorax quadrate, almost straight across apex, and broader than long. Mesoepimeron slender, the scent gland osteole near tip. Metaxyphus arrow-shaped, no longer than broad.

Front leg of male: Pala with almost parallel sides, elongate, with 28 to 30 teeth in peg row; basal carina not prominent; tibia with dorsal carina bearing about four spines on distal end; femur moderately slender with a patch of about 12 rows of stridulatory teeth on inner basal surface. Middle and hind legs relatively slender, the proportion of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 45.6 : 38.9 : 42.6; hind leg: femur : tibia :

tarsus 1 : tarsus 2 :: 100 : 94.6 : 127.4 : 52.8. Male asymmetry dextral. Strigil large, elongate, with about 14 fairly regular combs. For details of male structures see Plate LXXXI, figs. 1, 1a and 1b.

Comparative notes: In *H. interrupta* (Say) there are about 6 stout spines on the distal portion of the rear margin of the hind femur, and the head width usually exceeds 3.1 mm. which serves to separate it from *H. nitida* (Fieb.) which has a narrower head and about 10 spines on the distal portion of the rear margin of the hind femur.

Location of types: Say described the species from "Missouri" which, in 1825, covered a lot of territory. His types are lost but a female specimen in the Harris collection was determined by Say. We are setting up a lectotype series in the Francis Huntington Snow Collections, University of Kansas, to represent this species as determined by Say.

Data on distribution: (Plate LXXXII.) The published records, as indicated in the annotated bibliography above, cover too much territory. We have examined the following:

CANADA: *Quebec:* Montreal Island, May 30, 1903 (Wash. U. Coll.), 1 female.

Ontario: Ottawa (Uhler Coll.), 1 female.

U. S. A.: *Maine:* Peak's Isld., July 31, 1931, G. A. Moore; Orono, April 24, 1913, H. M. Parshley (Parshley Coll.), 1 male, 2 females.

Vermont: Winooski, Aug. 30, 1901 (Davis Coll.), 2 females.

New Hampshire: New Haverhill, Aug. 21, 1934, P. McKinstry, 12 males, 19 females; Bath, Aug. 21, 1934, P. McKinstry, 4 males, 7 females; Bath, Aug. 21, 1934, R. H. Beamer, 3 males; Durham, Sept. 20, 1901, Osborne, 3 males, 11 females; Hampton, March 31, 1933, S. Albert Shaw; same place and collector, April 15, 1933; same place, Aug. 7, 1910; same place, May 14, 1903.

Massachusetts: Forest Hills, April 24, 1921, R. F. Hussey (Hussey Coll.), 4 females; F. Blanchard, 1 female; Forest Hills, Sept. 14, 1914, H. M. Parshley (Parshley); Wellesley, 11 females; Springfield, April 19, 1900, F. Knabb, 1 female; Woods Hole, 3 males; Wilbraham, Nov. 2, 1902, F. Knabb, 1 male, 1 female; Melrose High, D. H. Clemons, 13 females; Sunderland, Nov. 23, 1917, H. M. Parshley (Parshley Coll.), 2 males; Mt. Toby, Sept. 3, 1919, Priscilla Butler, 1 female; Milton, March 26, 1922, W. Clench, 6 females; Forest Hills, March 24, 1922, W. J. Clench, 4 females; Forest Hills, 1914, H. M. Parshley (Parshley Coll.), 2 males, 6 females; Amherst, Aug. 30, 1904, 2 females; Forest Hills, Sept. 13, 1911, H. M. Parshley (Parshley Coll.), 2 males, 3 females; Sherborn, Sept. 7, 1916, C. A. Frost, 2 females; Medford, May, 1869, W. N. Dale, 1 female; Brooks, March 11, 1878, 1 female; Nonamesset Island, July 7, 1911, J. F. Abbott, 15 males, 28 females.

Connecticut: New Haven, Aug. 23, 1934, P. McKinstry, 2 males, 3 females; Hartford (Uhler), 1 male, 1 female (det. by Uhl. as *harrisii*); Westerley, Aug. 19, 1934, R. H. Beamer, 2 males; Litchfield, Sept. 4-10, 1924, L. B. Woodruff, 3 females; Hamden, Oct. 24, 1910, B. H. Walden, 1 male; So. Meridien, March 19, 1913, H. Johnson (Parshley), 1 female; Southington, May 21, 1910, B. H. Walden, 1 female.

Rhode Island: Providence (Davis Coll.), 1 male, 4 females, Rhode Island (C. F. Baker in U. S. N. M.); Rhode Island (Davis Coll.), 2 females; Kingston (Davis Coll.), 2 males, 3 females; Kingston, Nov. 11, 1909 (Parshley).

New Jersey: Orange, 2 males, 1 female; Fort Lee, July 4, 1904 (Drake); Palisades, Sept. 7, 1903 (Wash. U. Coll.), 3 males, 2 females; H. Muske, 1 male, 1 female; New Jersey (Uhler Coll.), 1 male, 2 females (det. by Uhler as *harrisii*); Lake Forest, Needham, 1 female; Rancoca, Aug. 29, 1927, E. M. Beckton, 1 male, 1 female; Delair (Torre-Bueno Coll.), 2 males, 4 females; Great Piece (Torre-Bueno Coll.), 3 males, 1 female; Ramsey, Sept. 9-19, 1909, 20 females; Madison, Crane (Uhler Coll.), 1 male; New Jersey (Uhler Coll.), 1 female; Riverton, Aug. 17, 1902, E. P Van Duzee (Van Duzee Coll.), 1 male.

New York: Long Island, May, 7 males, 16 females; Gowanda, Aug. 2-9, 1907, Van Duzee (Van Duzee); New York (Uhler Coll.), 1 male; Long Island, Queen's Village, Sept. 25, 1937, J. C. Lutz (Lutz); White Plains, Aug. 10, 1907 (Parshley), 1 female; Staten Isld., Aug., 1902 (Wash. U. Coll.), 1 female; Ashokan, July 30, 1909, 2 females; Nyack, Oct., 1898, 5 females; Staten Island, Aug. 5, 1916, 1 male; White Plains, Aug. 29, 1908, 1 male, 1 female; same place, Aug. 19, 1907, 1 female; Valhalla, 1 male; Ithaca, July 22, 1890, 1 male, 1 female; Ithaca, July 9, 1903 (Ill. Coll.); W. Shokan, July 30, 1909 (Amer. Mus. Nat. Hist. Coll.), 1 female; White Plains, July 19, 1907 (Parshley Coll.), 4 females; Cold Springs Harbor, L. I., July 11, 1919, H. M. Parshley (Parshley Coll.), 1 male, 3 females; same place, July 26, 1920, Priscilla Butler (Hussey), 4 males, 4 females; same place, July 5, 1920, H. M. Parshley (Parshley Coll.), 1 male, 2 females; Essex Co., 4 males, 2 females; Sodas Bay.

Pennsylvania: Barrens, Aug. 5, 1942, V. R. Haber, 18 males, 45 females; Pennsylvania, H. G. Klages, 2 males, 22 females; State College, summer 1930, Casselberry, 3 males, 12 females; Lehigh Gap, Aug. 11, 1904 (Drake), 1 male; Pittsburgh, Aug., 1914 (Carnegie Mus.), 1 male; Philadelphia, July 1, 1929, J. C. Lutz (Lutz Coll.), 4 males, 3 females; Lebanon Co., 2 mi. n. Lebanon, Sept. 20, 1932, E. G. Kauffman (Mich.), 1 male, 1 female.

Maryland: Baltimore, Sept. 4, 1897, P. R. Uhler (Uhler Coll.), 2 males, 5 females; Maryland (Uhler Coll.), 2 females; Lakeland, June 26, 1906; Pawtuxent Wild Life R., April 11, 1945, R. I. Sailer (U. S. N. M.), 1 male, 15 females; Odenton, July 14, 1913 (W. E. McAtee Coll. in U. S. N. M.), 1 male, 1 female; Hyattsville, Aug. 23, 1914, W. D. Appel (U. S. N. M.), 2 males; Seat Pleasant, July 27, 1938, P. Bartsch (U. S. N. M.), 1 male, 2 females; Bladensburg, July 8, 1892 (O. Heidemann Coll., Cornell U.), 1 male, 2 females.

Washington, D. C.: Sept. 21, 1890 (Heidemann Coll., Cornell U.), 1 male, 3 females; D. W. Clemons, 48 females.

West Virginia: Preston Co., Aug. 26, 1928, 2 females; Union Monroe Co., sinkhole, Paradise Park reservoir, Aug. 15, 1937, G. K. MacMillan (Carnegie), 3 males, 1 female.

Virginia: Church Bridge, D. H. Clemons, 3 females; Great Falls, D. H. Clemons, 3 females; same place, May 16, 1920, Priscilla Butler (Hussey), 4 females; Virginia, C. Humphrey (U. S. N. M.), 1 male, 1 female; Dogue Creek, July 6 (Nat. Mus.), 2 males, 2 females; Nelson Co., July 27, 1928, W. Robinson (Nat. Mus.), 1 female.

North Carolina: Raleigh, Nov. (Kirkaldy Coll.), 2 males, 4 females.

South Carolina: Rocky Bottom, Pickens Co., Sept. 20, 1931, D. Dunavan (S. C. Exp. Sta.), 2 males, 2 females; Andrews, Nov. 18, 1931, O. L. Cartwright (S. C. Exp. Sta.), 1 female.

Georgia: Marietta, March 5, 1911, J. C. Bradley, 1 male; Baker Co., Nov. 23, 1927, C. H. Martin, 4 males, 13 females; Baker Co., Dec. 23, 1946, L. W. Morgan, 1 male, 2 females; Houston Co., Sept. 4, 1929, Creaser and Becker, 4 males, 36 females.

Florida: (Uhler Coll.), 2 females.

Alabama: Crawford, July 24, 1930, P. W. Oman, 2 males.

Ohio: Columbus, Sept. 4, 1914, C. J. Drake (Drake Coll.), 1 male; same place, Sept. 4, 1914 (Parshley); Portsmouth, Aug. 27, 1915, C. J. Drake (Drake), 2 males.

Indiana: Kosciusko Co., July 8, 1932, G. E. Gould, 1 male, 2 females; Dune Park, July 2, 1904 (Wash. U. Coll.), 1 female; Lawrence Co., Aug. 7, 1907, W. S. B. (Blatchley), 1 male.

Michigan: North Michigan, Aug. 13, 1930, H. B. Hungerford, 1 female; Agricultural Coll. (Uhler Coll.), 1 female; Druid Hill (Uhler Coll.), 4 females; Ann Arbor, March 7, 1894, Wolcott (Neb. Coll.), 2 females; same place, Pittsfield Pond, Nov. 16, 1917 (Neb. Coll.), 2 females.

Wisconsin: Beaver Dam, July 20, 1909, W. E. Snyder, 1 male.

Illinois: Chicago (Uhler Coll.), 1 male; same place, July 2, 1904 (Wash. U. Coll.), 1 female; Ogle Co. (Uhler Coll.), 1 male; Illinois (Uhler Coll.), 1 female.

Arkansas: Fayetteville, March 27, 1930, D. Isely, 1 male, 4 females.

Nebraska: Lincoln, 1 female.

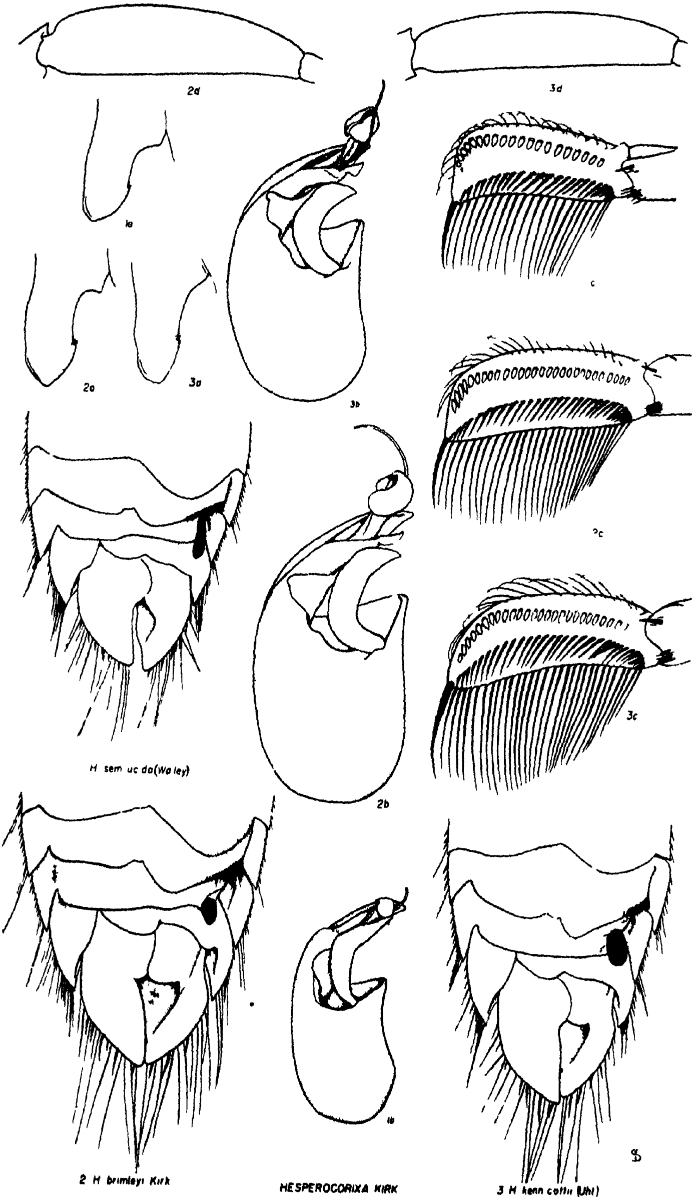
Missouri: Willard, A. E. Brower, 7 females.

PLATE LXXIX

Hesperocorixa Kirkaldy

Fig. 1. *Hesperocorixa semilucida* (Walley); dorsal view of male abdomen.
Fig 1a. Mesoepimeron.
Fig. 1b. Genital capsule of male.
Fig. 1c. Pala of male.
Fig. 2. *Hesperocorixa brimleyi* (Kirkaldy); dorsal view of male abdomen
Fig. 2a. Mesoepimeron.
Fig. 2b. Genital capsule of male.
Fig. 2c. Pala of male.
Fig. 2d. First tarsal segment of hind leg of male.
Fig. 3. *Hesperocorixa kennicottii* (Uhler); dorsal view of male abdomen.
Fig. 3a. Mesoepimeron.
Fig. 3b. Genital capsule of male.
Fig. 3c. Pala of male.
Fig. 3d First tarsal segment of hind leg of male.

PLATE LXXIX



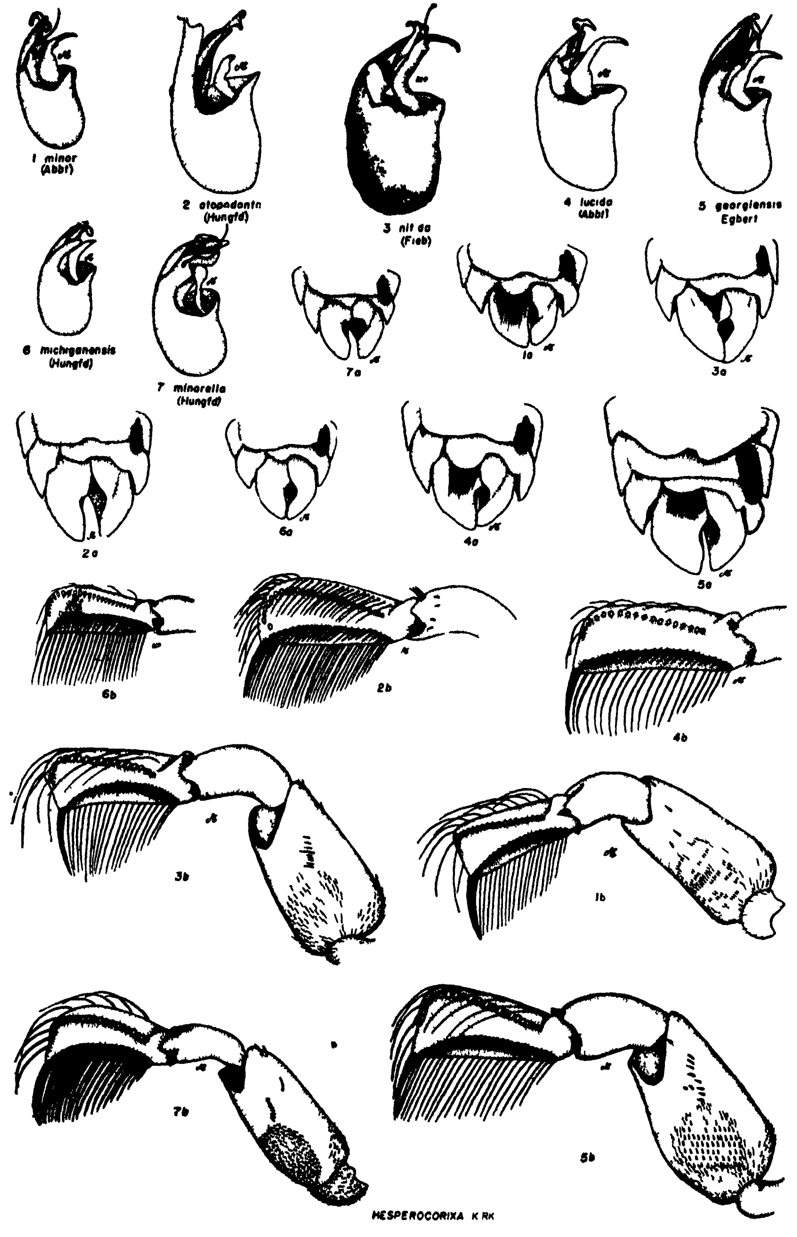
HESPEROCORIXA KIRK

PLATE LXXX

Hesperocorixa Kirkaldy

FIG. 1. *Hesperocorixa minor* (Abbott); genital capsule of male.
FIG. 1a. Dorsal view of male abdomen.
FIG. 1b. Pala of male.
FIG. 2. *Hesperocorixa atopodonta* (Hungerford); genital capsule of male.
FIG. 2a. Dorsal view of male abdomen.
FIG. 2b. Pala of male.
FIG. 3. *Hesperocorixa nitida* (Fieber); genital capsule of male.
FIG. 3a. Dorsal view of male abdomen.
FIG. 3b. Pala of male.
FIG. 4. *Hesperocorixa lucida* (Abbott); genital capsule of male.
FIG. 4a. Dorsal view of male abdomen.
FIG. 4b. Pala of male
FIG. 5. *Hesperocorixa georgiensis* (Egbert); genital capsule of male.
FIG. 5a. Dorsal view of male abdomen.
FIG. 5b. Pala of male.
FIG. 6. *Hesperocorixa michiganensis* (Hungerford); genital capsule of male
FIG. 6a. Dorsal view of male abdomen.
FIG. 6b. Pala of male.
FIG. 7. *Hesperocorixa minorella* (Hungerford); genital capsule of male.
FIG. 7a. Dorsal view of male abdomen.
FIG. 7b. Pala of male.

PLATE LXXX



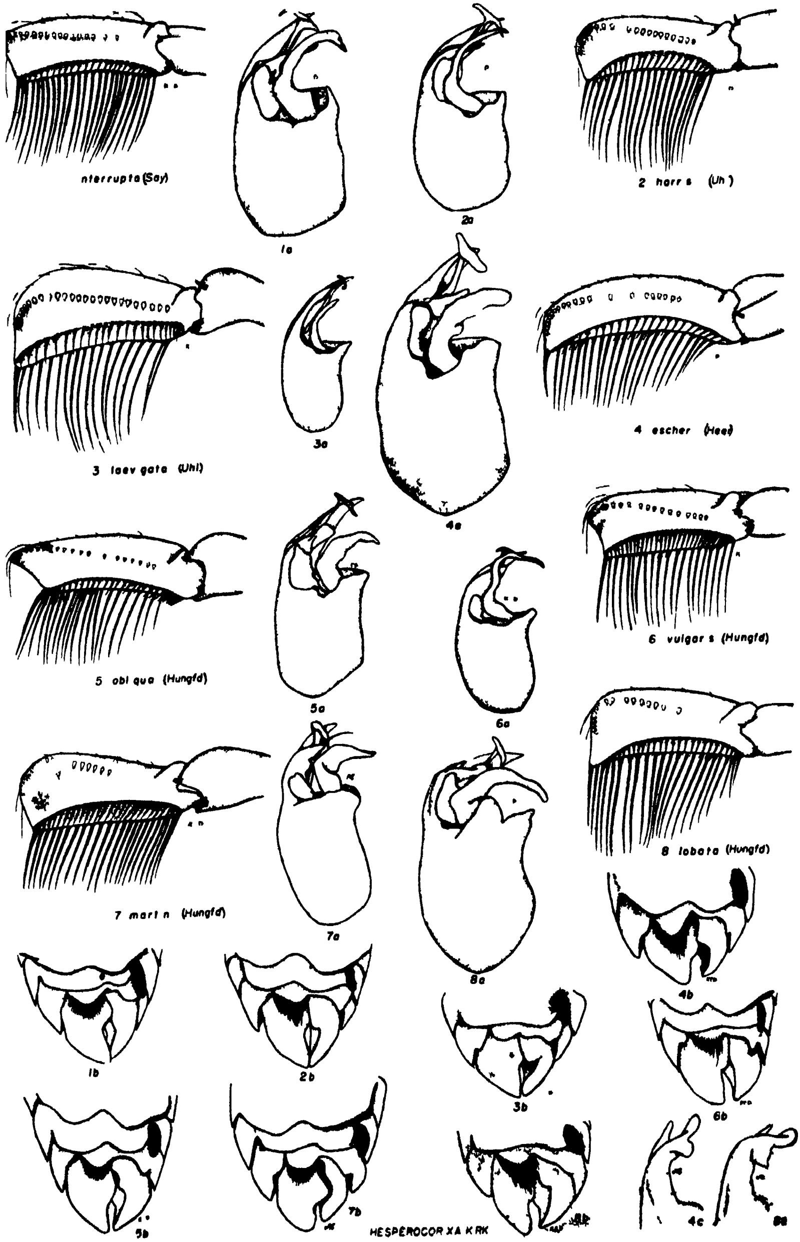
HESPEROCORIXA K RK

PLATE LXXXI

Hesperocorixa Kirkaldy

FIG. 1. *Hesperocorixa interrupta* (Say); pala of male.
FIG. 1a. Genital capsule of male.
FIG. 1b. Dorsal view of male abdomen.
FIG. 2. *Hesperocorixa harrisii* (Uhler); pala of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Dorsal view of male abdomen.
FIG. 3. *Hesperocorixa laevigata* (Uhler); pala of male.
FIG. 3a. Genital capsule of male.
FIG. 3b. Dorsal view of male abdomen.
FIG. 4. *Hesperocorixa escheri* (Heer); pala of male.
FIG. 4a. Genital capsule of male.
FIG. 4b. Dorsal view of male abdomen.
FIG. 5. *Hesperocorixa obliqua* (Hungerford); pala of male.
FIG. 5a. Genital capsule of male.
FIG. 5b. Dorsal view of male abdomen.
FIG 6. *Hesperocorixa vulgaris* (Hungerford); pala of male.
FIG. 6a. Genital capsule of male.
FIG. 6b. Dorsal view of male abdomen.
FIG. 7. *Hesperocorixa martini* (Hungerford); pala of male.
FIG. 7a. Genital capsule of male.
FIG. 7b. Dorsal view of male abdomen.
FIG. 8. *Hesperocorixa lobata* (Hungerford); pala of male.
FIG. 8a. Genital capsule of male
FIG. 8b. Dorsal view of male abdomen.

PLATE LXXXI


nterrupta (Say)
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3a
4a
4 escher (Hee)
5 obl qua (Hungfd)
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6a
6 vulgar s (Hungfd)
7 mart n (Hungfd)
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PLATE LXXXII

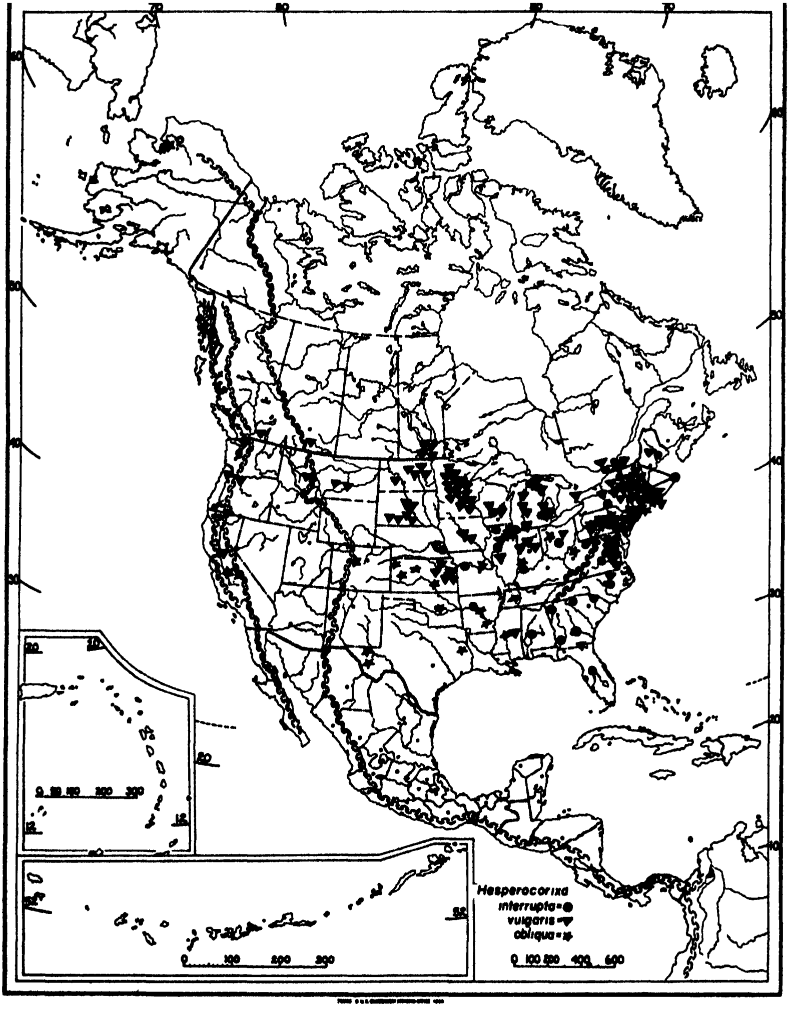


PLATE LXXXIII

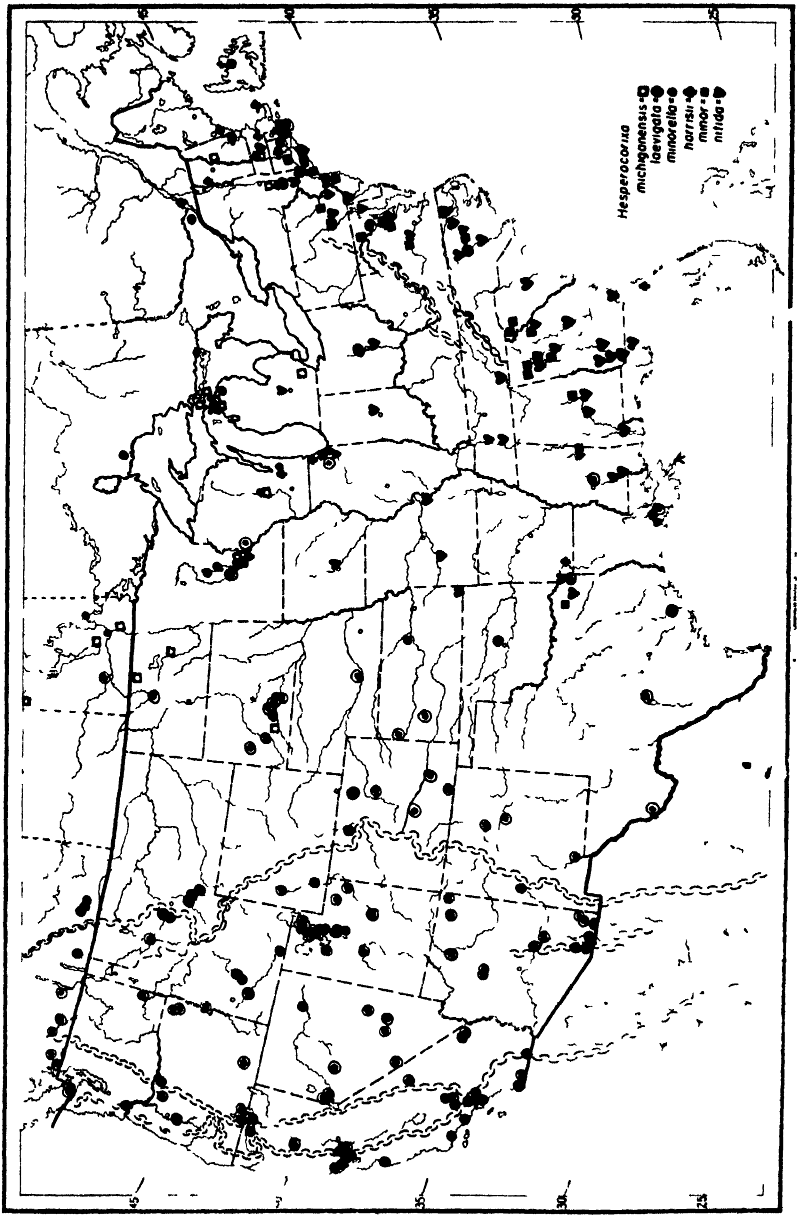


PLATE LXXXIV

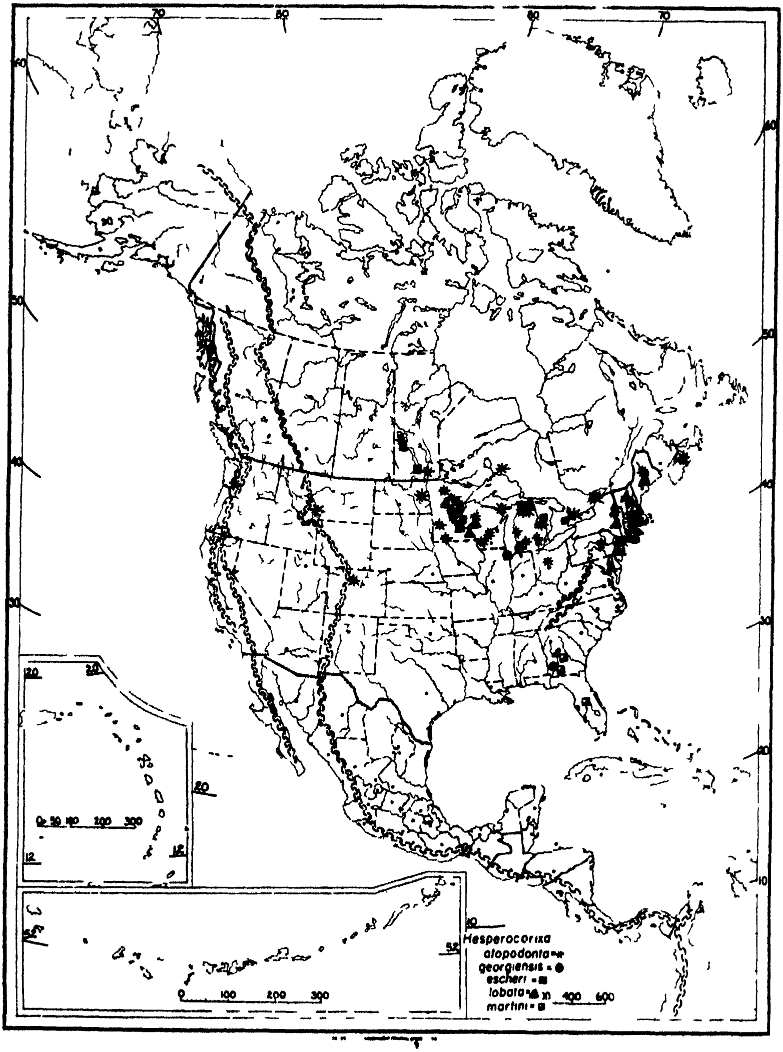
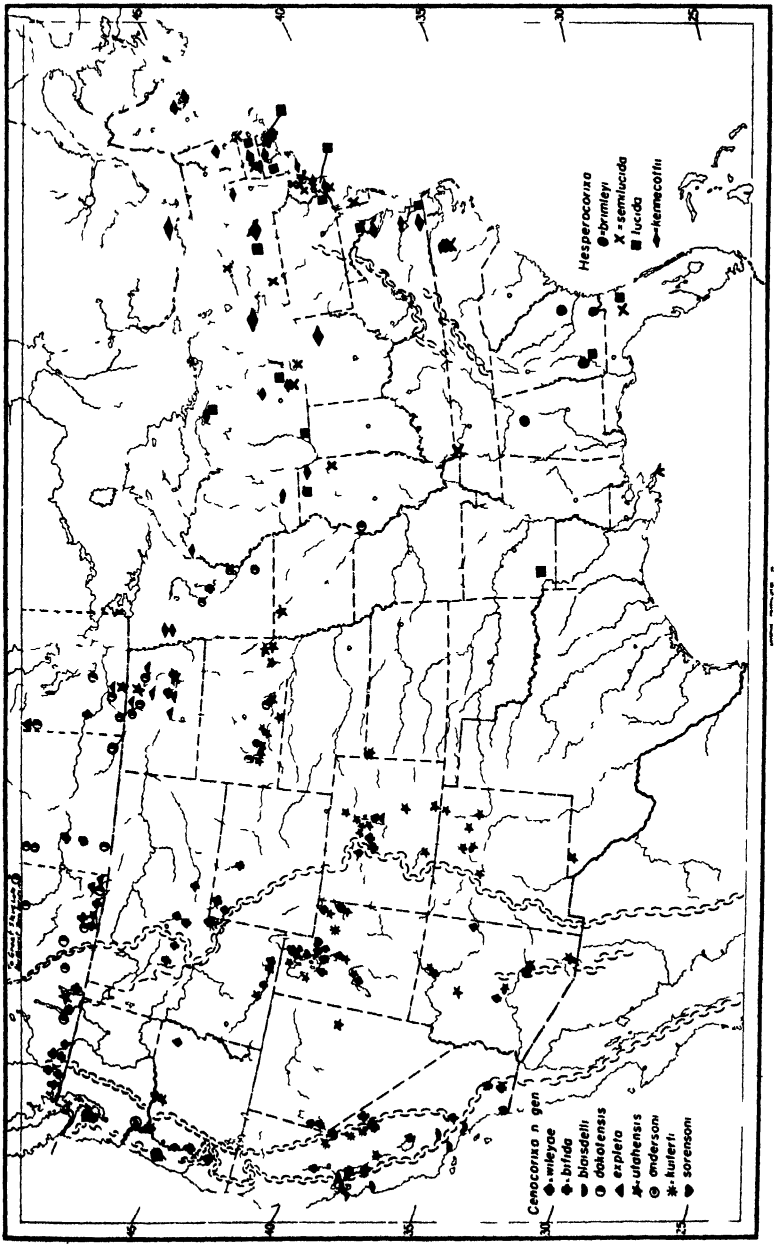


PLATE LXXXV


45
40
35
30
25
Hesperocorixa
● = brimleyi
X = semilucida
■ lucida
◆ = kennecotti
Cenocorixa n gen
● wileyae
● bifida
▬ blaisdelli
◐ dakotensis
▲ expleta
★ utahensis
◎ andersoni
✱ kuiterti
❤ sorensoni

Genus *Cenocorixa* new

Corixids of moderate size. Head with rather wide interocular space and with its anterior margin usually somewhat roundly produced in both sexes. Pronotum rastrate, crossed by many brown bands and with a median longitudinal carina on anterior portion. Lateral lobe of prothorax elongate, its tip truncate to slightly rounded. Metaxyphus rather narrow. Female pala rather elongate. Male pala broad with a longitudinal ridge on the outside, at least on the basal half. Middle leg with claws plainly longer than the tarsus. Last ventral abdominal segment of female incised at tip except in *C. sorensoni* n. sp. With numerous irregular, somewhat anastomosing, brown figures on hemelytra which in unrubbed specimens have many more or less procumbent hairs.

Genotype: *A. wileyæ* Hungerford.

While the females of this genus have the last ventral segment incised at tip like *Arctocorisa* Wallengren, they are not elongate, lack the pronounced pronotal carina, and have longer claws on the middle tarsus.

KEY TO *CENOCORIXA* NEW GENUS

1 Males without a stridular area on front femur; females with the 7th ventral abdominal segment not medianly incised............ ..*C. sorensoni* n. sp. (p. 565)

Males with a stridular area on front femur; females with the 7th ventral abdominal segment incised medianly 2

2 (1) With the hind femur pubescent for little more than one-third its length; right clasper of male as on Plate LXXXVII, fig. 2b.... *C. dakotensis* (Hungfd.) (p. 567)

With the hind femur pubescent for more than 40 percent of its length 3

3. (2) With the shining costal area just anterior to the nodal furrow equal in length to the middle tarsus 4

With the shining costal area just anterior to the nodal furrow longer than the middle tarsus; male pala with the peg row divided. . .. *C. bifida* (Hungfd.) (p. 569)

4. (3) With the last segment of hind tarsus deeply embrowned for its entire length, male strigil small; right clasper of male as on Plate LXXXVII, fig. 1b. *C. kuiterti* n. sp. (p. 571)

With hind tarsi concolorous throughout, or with only the tip of last segment embrowned 5

5. (4) Interocular space slightly narrower than an eye, right clasper of male as on Plate LXXXVI, fig. 2b . . . . *C. andersoni* n. sp. (p. 573)

Interocular space equal to or broader than an eye 6

6. (5) Interocular space equal to an eye; right clasper of male as on Plate LXXXVI, fig. 1b .. ..*C. blaisdelli* (Hungfd.) (p. 574)

Interocular space broader than an eye.......... 7

7. (6) Male pala with a spinose tumescence at base (see Plate LXXXVI, fig. 4c); females with the pruinose area along the claval suture longer than the greatest length of the post-nodal pruinose area. ....*C. expleta* (Uhler) (p. 576)

Male pala not as above; females with the pruinose areas of equal length or the post-nodal one slightly longer than the one along the claval suture...... 8

8 (7) Male pala with the peg row doubly curved distally (see Plate LXXXVI, fig. 8c); head of female less than half the length of the pronotal disk. *C. wileyæ* (Hungfd.) (p. 578)

Male pala with peg row evenly curved (see Plate LXXXVII, fig. 3c); head of female about two-thirds as long as the pronotal disk. .*C. utahensis* (Hungfd.) (p. 580)

Cenocorixa sorensoni n. sp.

(Text fig. 6)

Size: Length 5.2 mm. to 6.3 mm. Width across eyes 1.7 mm. to 2 mm.

Color: General facies medium brown; pronotum crossed by 6 or 7 brown lines which are quite irregular and somewhat narrower than the intervening pale spaces; typically, but not always, the base of the pronotum is unbanded; clavus and corium definitely crossbarred, the corial pattern somewhat more irregular than that of the clavus; membrane and corium separated by a pale line; membranal pattern generally reticulate, but with some crossbarring on central portion. Embolium, head, limbs, and venter pale, except that tip of the middle tarsus and the tip of the second tarsus of the hind leg are typically infuscated.

Structural characteristics: Head about two-thirds as long as the pronotal disk; interocular space a little greater than the width of an eye; vertex slightly produced in both sexes; male fovea scarcely discernible; face not hairy; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 20 males; 1 : 2 : 3 : 4 :: 20 : 18 : 40 : 22 females. Pronotal disk with median carina visible on anterior fourth; pronotum and hemelytra moderately rastrate, the latter with a few long, pale hairs. Pruinose area of the embolar groove posterior to the nodal furrow somewhat shorter than that of the claval suture; lateral lobe of the prothorax longer than broad, sides parallel, tip blunt. Mesoepimeron narrow with osteole about one-third the distance from tip to the bend; metaxyphus about as broad at base as long, apex rather blunt. Front leg of female normal with about 17 hairs in lower palmar row. Front leg of male: Femur rather stout with lower margin somewhat swollen; no stridular area; tibia slender, almost wedge-shaped, with pronounced dorsal carina and a pad; pala broad and rather short compared to breadth, with 34 pegs arranged in a row curved beyond middle and with a ridge across face of pala; outside of pala with ridge at least two-thirds its length. Middle and hind legs slender; dorsal surface of hind femur with from 4 to 6 short spines; comparative measurements of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 47.4 : 31.3 : 41.6.

Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.3 : 111.4 : 41.5. Male asymmetry dextral, strigil oval, moderately large, of 7 regular combs. Right clasper of the male genital capsule not bifurcate at the tip. For details of male structures see text fig. 6. Female abdomen with the seventh abdominal segment not notched medianly at apex, the margin faintly concave, but with the anal lobes notched on the inner ventral surface.

Comparative notes: This is the smallest species so far described in this group.

Location of types: Holotype male, allotype female and 7 male and 12 female paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas. Six male and thirteen female paratypes at the Utah Experiment Station. The type series labeled "Brigham, Utah, July 15, 1934, C. J. Sorenson (Utah Exp. Sta.)."

Data on distribution: (Plate LXXXV).

Utah: Brigham, Aug. 16, 1934, F. H. Gunnell (Utah Exp. Sta.), 1 male, 1 female; same place and collection, July 16, 1934, Knowlton and Smith, 2 females; Hooper, June 25, 1936, at light, G. F. Knowlton, 1 male; Logan, June 26, 1943, same collector, 1 male, 2 females; Heber, June 26, 1943, same collector, 1 female; Wanship, June 28, 1943, same collector, 1 female.

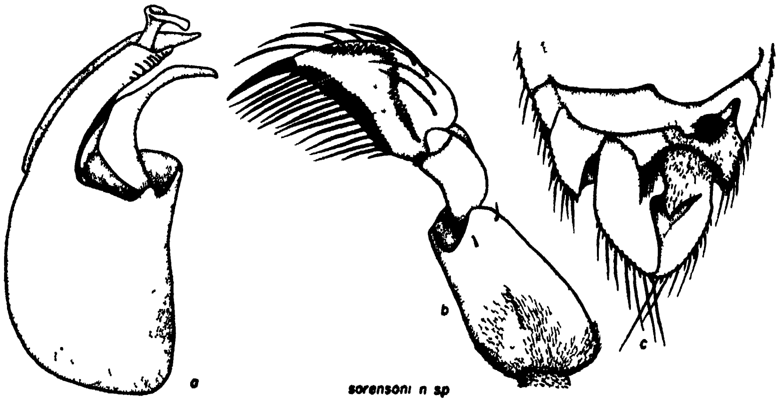


FIG. 6. *Cenocorixa sorensoni* n sp., (a) genital capsule of male; (b) front leg of male; (c) dorsal view of male abdomen.

Cenocorixa dakotensis (Hungerford)

(Plate LXXXVII, figs. 2, 2a-2c)

1928. *Arctocorixa dakotensis* Hungerford, H. B. Can. Ent., LX, pp. 229-230, Pl. 18, fig. 2.

1944. *Arctocorixa dakotensis*, Rawson, D. S., and Moore, J. E. Can. Jl of Res., XXII, p. 182.

Size: Length 6.8 mm. to 7.6 mm. Width of head across eyes 2.1 mm. to 2.3 mm.

Color: General facies medium. Pronotum crossed by 9 to 10 irregular, narrow brown bands, a little more than half the width of pale interspaces. Claval pattern in broken, zigzag lines, more or less transverse. Dark areas of corium broken, arranged in longitudinal series. Membranal pattern reticulate, separated from corium by pale line. Embolium, head and thoracic venter pale. Abdominal venter pale to smoky. Last tarsal segment of hind legs black.

Structural characteristics: Head of male about three-fifths as long as pronotal disk; interocular space greater than width of an eye; vertex, as seen from above, roundly produced beyond margins of eyes in both sexes, although more so in male; facial hairs few; male fovea shallow, broad, not quite attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 18 : 40 : 25 ♂ ; 1 : 2 : 3 : 4 :: 22 : 18 : 42 : 30 ♀. Pronotal disk with median carina on anterior third; pronotum finely rastrate, hemelytra rugulose, with a few pale hairs. Lateral lobe of prothorax elongate, tip truncate; mesoepimeron narrow with osteole near the tip; metaxyphus about as broad as long, pointed apically. Front leg of female of typical shape, with about 15 hairs in lower palmar row. Front leg of male: pala moderately broad, the dorsal edge sinuous, the pegs in a curved, unbroken row and numbering 34, outside of pala with a carina on basal half near the dorsal margin; tibia about two-thirds the length of the pala, with dorsal carina present but not sharp, and with a pad; femur rather stout, lower margin rounded, and with a patch of about 12 rows of stridulatory pegs on inner basal surface. Middle and hind legs slender; middle femur not spinose; hind femur with a row of 5 or 6 short spines on dorsal surface; proportions of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 46.8 : 34.2 : 38. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89 : 115.5 : 49.9. Male asymmetry dextral; strigil of moderate size, of 7 regular combs. Right clasper of male genital capsule bifurcate at tip, the processes rather slender. For details of male pala, abdomen, and genitalia see Plate LXXXVII, figs. 2, 2a, 2b and 2c. Female abdomen with seventh ventral segment broadly incised at tip.

Comparative notes: The embrowned to black last tarsal segment of the hind leg separates this species from the others of this group.

Location of types: Described from 10 specimens taken by T. H. Hubbell in the Turtle Mountains of North Dakota, Aug. 3, 1920. Holotype male, allotype female, 4 males and 4 females paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution (Plate LXXXV):

CANADA: *N. W. T.:* Great Slave Lake, Outpost Isl., Aug. 22, 1945, D. S. Rawson, 1 male.

Manitoba: Hartney, July 31, 1937, R. H. Beamer, 1 male; Shoal Lake, same date, H. T. Peters, 1 female.

Saskatchewan: Redberry Lake, 1940 (via D. S. Rawson), 13 males, 7 females; Turtle Lake, Sept. 1940 (via Rawson), 1 male; Jackfish Lake, same date (via Rawson), 1 male, 1 female; Alawaba, Sept. 3, 1915, J. P. Miller, 1 male, 1 female; Long Lake, June 14, 1938, D. S. Rawson, 1 male.

Alberta: Athabaska, Sept. 24, 1943, D. S. Rawson, 1 male; Medicine Hat, July 11, 1920, 3 males, 3 females; New Dayton, July 10, 1930, J. H. Pepper; Medicine Hat, Sept. 17, 1929, same collector; Cypress Hills, July 21, 1930, same collector (latter three records by G. S. Walley).

U. S. A.: *Minnesota:* Cooley, Aug. 13, 1937, C. L. Johnston, 1 male; Faribault, June 14, 1934, A. A. Granovsky, 1 female; St. Paul, July 6, 1934, same collector, 1 male.

Illinois: Ogle Co. (Uhler Coll.), 1 male.

North Dakota: Tappen, July 23, 1937, R. H. Beamer, 1 male, 5 females; Omemee, July 29, 1937, H. T. Peters, 7 females; Turtle Mts., Aug. 3, 1920, T. H. Hubbell, 4 males, 6 females; Ramsey Co., Lake Irvin, Aug. 21, 1922, T. L. Hankinson (Mich. Coll.), 3 males, 2 females; Lake Metagoshe, July 30, 1937, H. T. Peters, 11 males, 3 females; same place and date, C. L. Johnston, 15 males, 18 females.

South Dakota: Brookings Co., Lake Oakwood, Aug. 11, 1939, H. C. Severin, 4 males, 2 females (Severin).

Cenocorixa bifida (Hungerford)

(Plate LXXXVII, figs. 4, 4a-4e)

1926. *Arctocorixa bifida* Hungerford, H. B. Can. Ent., Vol. LVIII, p. 268, Pl. on p. 269, fig. 7 (desc. from Alberta, Can.).

1928. *Arctocorixa bifida*, Hungerford, H. B. Can. Ent., Vol. LX, p. 230 (compared with *A. dakotensis* Hungfd.)

1936. *Arctocorixa bifida*, Walley, G. S. Can. Ent., Vol. LXVIII, p. 60 (lists Alberta and B. C., Can.).

Size: Length 6.9 mm. to 7.8 * mm. Width of head across eyes 2.2 mm. to 2.5 mm.

Color: General facies medium to dark. Pronotum crossed by about 10 irregular dark bands about half as wide as pale interspaces. Claval pattern of broken, vermiculate dark splotches. Corial dark pattern of short, vermiculate figures arranged in faintly longitudinal series. Membrane and corium indistinctly separated by a pale line. Embolium, head, and limbs pale. Venter smoky to black.

Structural characteristics: Head about half as long as pronotal disk; interocular space greater than width of an eye; vertex of male as seen from above considerably produced medianly beyond margins of eyes; facial hairs few; male fovea broad, almost attaining eyes laterally, and rather deep, well defined, overhung medially by a projection of the vertex; antennal segmentation: 1 : 2 : 3 : 4 :: 26 : 18 : 45 : 30 ♂ ; 1 : 2 : 3 : 4 :: 25 : 18 : 45 : 28 ♀. Pronotal disk with median carina visible on anterior fourth; faintly rastrate; hemelytra rugulose, with a few to numerous pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of the claval suture. Lateral lobe of prothorax elongate, truncate apically; mesoepimeron narrow, osteole near tip; metaxyphus a little broader than long, pointed apically. Front leg of female of typical shape with about 15 hairs in lower palmar row; front leg of male: pala moderately broad, bent inward on dorsal margin just before apical third, peg row broken, 11 pegs in distal portion of row and 15 pegs in basal portion; outside of pala with carina on basal half; tibia two-thirds as long as pala, with a sharp dorsal carina and no pad; femur fairly slender, inner margin somewhat rounded, about 8 to 10 rows of stridulatory teeth on inner surface near base. Middle and hind legs slender; middle femur not spinose, hind femur dorsally with 2 or 3 rows of short spines; relative length of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 47.4 : 32 : 37.1. Hind leg: femur : tibia : tarsus 1 :

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* Measurement of 8.8 mm. in original description was incorrect.

tarsus 2 :: 100 : 95.5 : 124.3 : 51.1. Male asymmetry dextral; strigil large, of about 16 irregular combs; rear margin of seventh abdominal segment sinuous. Right clasper of male genital capsule bifurcate at tip, the processes curved and moderately broad, ends pointed. For details of male pala, abdomen and genitalia see Plate LXXXVII, figs. 4, 4a, 4b and 4c. Female with seventh ventral abdominal segment broadly incised at tip.

Comparative notes: The broken peg row on the male pala separates this species from *C. kuiterti* and *C. utahensis.*

Location of types: Described from two males and two females from Lost Lake, Alberta, Canada. Holotype, allotype and paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate LXXXV.) We have studied the following:

CANADA: *British Columbia:* Peachland, July 28, 1909, J. B. Wallis (Wallis Coll.), 1 male; British Columbia, Sept. 11, 1945, H. B. Leech, 4 males, 2 females; Vernon, Sept. 26, 1919, W. Downes, 1 male, 5 females; Oliver, Aug. 6, 1931, L. D. Anderson, 1 male; Nulki Lake, June 10, 1945, J. A. Munro, 5 males, 6 females; Kamloops, Nov. 1, 1929, Owen Bryant (Bryant Coll.).

Alberta: Medicine Hat, June 11, 1920, 1 male, 3 females; Retlaw, Aug. 20, 1921, W. Carter, 1 male; Lost Lake, 3 males, 3 females; Pincher Cr., Sept. 15, 1928, Owen Bryant (Bryant Coll.).

Saskatchewan: Murray Lake, 1940, D. S. Rawson, 1 male, 1 female; Alameda, Sept. 3, 1915, J. P. Miller, 1 male, 1 female.

Manitoba: Russell, Aug. 1, 1937, Peters and Johnston, 34 males, 16 females.

U. S. A.: *California:* Mono Co., Adobe Valley, July 27, 1938, C. L. Hubbs (Mich. Coll.), 1 male, 4 females; Fresno Co., 9,000 ft. Mt. Kaiser, Aug. 2, 1919, F. E. Blaisdell, 1 male (Van Duzee).

Utah: Spring Creek, R. E. Nye, 1 male (Utah Exp. Sta. Coll.); Logan, Sept. 5, 1930, M. J. James (Utah Exp. Sta. Coll.), 2 males, 3 females.

Idaho: Burley, July 6, 1931, L. D. Anderson, 1 male, 1 female; Snake River (Uhler Coll.), 1 male, 1 female; Beaver Canyon, 1907 (O. Heidemann, Cornell U.), 1 male.

Montana: Bozeman, June 11, 1927, 1 female; same place, May 5-20, 1927, 1 male, 1 female; same place, May 11, 1906, 1 female; same place, March 30, 1906, 1 male, 2 females; Broadwater Co., Aug. 23, 1941, G. K. MacMillan (Carnegie), 2 males, 2 females; Bozeman, April 28, 1916, 1 male; same place, June 4, 1913, 1 male, 1 female; Drummond, Aug. 11, 1931, L. D. Anderson, 2 females; Whitehall, Aug. 13, 1931, same collector, 4 males, 2 females; Bennett, Aug. 12, 1931, same collector, 1 male, 5 females; Three Forks, July 22, 1931, same collector, 4 males; Anaconda, Aug. 12, 1931, same collector, 18 males, 28 females; Madison R., Aug. 26, 1926, G. Cady, 4 males, 2 females; Gallatin Co.; May 30, 1927, 1 male; same place, May 25, 1922, 1 male; same place, April 24, 1916, 1 female; same place, June 2, 1927, F. Hinman, 1 female; same place, May 6, 1927„ 1 female.

Wyoming: Two-gwo-tee, Aug. 28, 1926, G. Cady, 1 male, 1 female; Yellowstone Nat'l Park, Aug. 15, 1931, L. D. Anderson, 1 male; Grand Teton Nat'l Park, Aug. 18, 1931, same collector, 2 males; Yellowstone Nat'l Park, Aug. 22-24, 1915 (Uhler Coll.), 1 male.

Colorado: Rabbit's Ear Pass, 10 miles north, Aug. 21, 1941, H. C. Severin, 1 male, 1 female (Severin); Gould, Aug. 18-20, 1941, same collector, 2 males, 1 female; Cameron's Pass, Aug. 20, 1940, L. C. Kuitert, 2 males; Welden, Aug. 25, 1941, H. C. Severin (Severin).

North Dakota: Leonard, July 25, 1937, C. L. Johnston, 1 male.

Minnesota: Stephen, Aug. 10, 1937, C. L. Johnston, 1 male.

Rhode Island: (Uhler Coll.) 3 males, 3 females.

Cenocorixa kuiterti n. sp.

(Plate LXXXVII, figs. 1, 1a-1d)

Size: Length 7.2 to 7.6 mm. Width of head across eyes 2.2 to 2.6 mm.

Color: General facies medium to dark. Pronotum crossed by about 10 broken, irregular dark bands, a little narrower than pale interlineations. Dark pattern of clavi rather broken, in irregularly transverse series. Corial pattern of short, dark, vermiculate transverse figures somewhat fused into faint longitudinal series. Corium and membrane plainly separated by a pale line. Embolium, head, and limbs pale, except last tarsal segment of hind leg, more or less embrowned. Venter pale to smoky.

Structural characteristics: Head of male about two-thirds as long as pronotal disk, that of female about half as long; interocular space greater than width of an eye; vertex of male rounded out beyond margins of eyes; facial hairs few; male fovea broad and fairly deep; antennal segmentation: 1 : 2 : 3 : 4 :: 24 : 18 : 48 : 35 ♂; 1 : 2 : 3 : 4 :: 25 : 20 : 50 : 35 ♀. Pronotal disk with distinct median carina on anterior third; both pronotum and hemelytra finely rastrate, the latter with numerous short, pale hairs on corium; pruinose area of embolar groove posterior to nodal furrow equal in length to that of the claval suture. Lateral lobe of prothorax elongate, tip truncate; mesoepimeron narrow with osteole near tip; metaxyphus about as broad as long, pointed apically. Front leg of female of typical shape with about 18 hairs in lower palmar row. Front leg of male: pala moderately broad, dorsal edge curved inward at about the middle, carina present at base of pala; pegs in a single, curved row, numbering about 28; outside of pala with ridge on basal two thirds; tibia half as long as pala, with sharp, pronounced carina and no pad; femur of moderate size, margins nearly parallel, with 8 to 9 rows of stridulatory pegs on inner surface; middle and hind legs relatively slender, middle femur not spinose, hind femur with 2 or 3 short rows of short spines on dorsal surface; relative proportions: Middle leg: femur : tibia : tarsus : claw :: 100 : 46.9 : 35.9 : 40.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.5 : 117.2 : 51.1. Male asymmetry dextral; strigil small, of 5 regular combs. Right clasper of genital capsule bifurcate at tip, the processes very broad. For details of male pala, abdomen, and genitalia see Plate LXXXVII, figs. 1, 1b, 1c and 1d. Female abdomen with tip of seventh ventral segment broadly incised.

Comparative notes: This species differs from *C. utahensis* in shape of right clasper of the male and from *C. bifida* in having the peg row of the pala unbroken.

Location of types: Holotype male, allotype female, 3 male and 13 female paratypes labeled "Tuolemne Meadows, Calif., Aug. 1, 1940, L. C. Kuitert"; 1 female paratype labeled "Lone Pine, Calif., July 28, 1940, L. C. Kuitert." The above series in the Francis Huntington Snow Entomological Collections, University of Kansas.

Distribution records: (Plate LXXXV.) Besides the type series we have the following:

California: Placer Co., August, 1 male; Madera Co., Chilkoot Lake, July 23, 1946, R. L. Usinger (Usinger), 3 males, 1 female.

Utah: Duchesne, Aug. 17, 1940, L. C. Kuitert, 1 female; Wasatch Mts., July 17, 1921, Grace Wiley, 1 male, 1 female

Cenocorixa andersoni n. sp.

(Plate LXXXVI, figs 2, 2a-2c)

Size: Length 6.8 mm. to 7.6 mm. Width of head across eyes 2.1 mm. to 2.4 mm.

Color: General facies dark. Pronotum crossed by 8 to 9 dark bands about equal in width to pale interlineations, the median ones somewhat broken. Claval pattern irregularly transverse; that of corium of short, vermiculate dark figures, fused into somewhat longitudinal series. Membrane and corium plainly separated by pale line. Embolium generally pale although in some specimens it tends to be smoky; head dark, limbs pale, venter smoky to black.

Structural characteristics: Head about two-thirds as long as pronotal disk, interocular space slightly less than width of an eye; vertex of male not produced beyond eye margins as seen from above; facial hairs few; male fovea deep but rather narrow, not attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 18 : 45 : 32 ♂; 1 : 2 : 3 : 4 :: 25 : 20 : 45 : 30 ♀. Pronotal disk with median carina visible on anterior third; pronotum and hemelytra moderately rastrate, the latter with numerous short pale hairs; pruinose area of embolar groove posterior to nodal furrow plainly longer than that of claval suture. Lateral lobe of prothorax about as long as basal width, tip truncate; mesoepimeron narrow with osteole near tip; metaxyphus as broad as long, apex pointed. Front leg of female of usual shape with about 20 hairs in lower palmar row of pala. Front leg of male: Pala moderately broad, dorsal edge sinuous, base of pala with a carina on dorsal margin, about 30 pegs in a single curved row; outside of pala with a carinate ridge on more than basal half; tibia about half as long as pala, with a sharp dorsal carina and no pad; femur relatively slender, margins nearly parallel, a patch of about 8 rows of stridulatory pegs on inner surface. Middle and hind legs relatively slender; hind femur with row of 4 to 10 short spines on dorsal surface; comparative measurements of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 54.1 : 35.6 : 42.2. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.8 : 121 : 50.2. Male asymmetry dextral; strigil large, of 12 regular combs. Rear margin of seventh abdominal segment, from tip of median lobe, almost straight. Right clasper of male genital capsule not bifurcate at tip. For details of male pala, abdomen and genitalia see Plate LXXXVI, figs. 2, 2a, 2b and 2c. Female abdomen with seventh ventral segment broadly incised at tip.

Comparative notes: In the key this species runs out with *C. blaisdelli* from which it can be separated by the palar and genital characters of the male and by the relatively broader lateral lobe of the prothorax.

Location of types: Holotype male, allotype female, and 10 female paratypes labeled "Kalama R., Wash., July 21, 1931, L. D. Anderson," in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate LXXXV.) Besides the type series we have seen the following:

Oregon: Florence, July 11, 1935, Jack Beamer, 1 male, 1 female.

Washington: Mason Co., Lake Cushman, Aug. 31, 1919, P. Putnam, 1 male, 2 females (Mich. Coll.).

Cenocorixa blaisdelli (Hungfd.)

(Plate LXXXVI, figs 1, 1a-1c)

1930. *Arctocorixa blaisdelli* Hungerford, H. B. Pan-Pac. Ento., Vol. VII, p. 26, Pl. on p. 24, figs. 1 and 2.

1931. *Sigara blaisdelli*, Jaczewski, T. Archiv fur Hydrobiologie, XXIII, pp. 511-518, figs. 9-12. (From Tacoma, Wash., in Hamburg Mus.).

Size: Length 6.6 mm. to 7.3 mm.* Width of head across eyes 2.2 mm. to 2.3 mm.

Color: General facies medium. Pronotum crossed by 8 to 10 irregular brown bands about equal in width to pale interlineations. Claval pattern irregularly transverse, the dark pigment dominant over light. Corial pattern with dark pigment vermiculate and sometimes arranged in faint longitudinal series. Corium and membrane separated by a pale line. Embolium pale to smoky; head and limbs pale; venter smoky to black.

Structural characteristics: Head about half as long as pronotal disk; interocular space equal to the width of an eye; vertex of male not produced; facial hairs few; male fovea narrow, shallow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 18 : 40 : 25 ♂; 1 : 2 : 3 : 4 :: 25 : 18 : 40 : 25 ♀. Pronotal disk with median carina faintly visible on anterior fourth; pronotum and hemelytra moderately rastrate, the latter with a few pale hairs; pruinose area of embolar groove posterior to nodal furrow longer than that of claval suture. Lateral lobe of prothorax elongate, tip truncate; mesoepimeron narrow with osteole near end; metaxyphus about as broad as long, apex pointed. Front leg of female normal with about

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*The 8.4 mm. of original description was in error due to miscalculation of eyepiece micrometer scale.

20 hairs in lower palmar row. (The right front femur of one female has several rows of small stridulatory pegs on inner surface. These do not occur on the other femur of this specimen or upon any other specimens examined.) The male pala moderately broad, dorsal edge curved slightly inward at about the middle, about 32 pegs in a single curved row, a low ridge on basal third of outside of pala near dorsal edge; tibia about half as long as pala, dorsal carina sharp and pronounced, no pad; femur relatively slender, margins nearly parallel with 10 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not spinose; hind femur with a row of short pegs on dorsal surface; comparative measurements of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 53.4 : 36.7 : 48.4. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 91.8 : 113.5 : 51.3. Male asymmetry dextral; strigil large, of 13 irregular combs. Rear margin of seventh abdominal segment sinuous. Right clasper not bifurcate at tip. For details of male pala, abdomen and genitalia see Plate LXXXVI, figs. 1, 1a, 1b and 1c. Female abdomen with seventh ventral segment broadly incised at tip; anal lobes not notched on inner ventral margins.

Comparative notes: This species is very closely related to *C. andersoni* from which it can be distinguished both by the pala and the genital clasper.

Location of types: Described from the following series: seven specimens, Vine Hill, Contra Costa Co., Calif., July 5, 1911, F. E. Blaisdell; two specimens, San Francisco, Calif., July 9, 1911, E. C. Van Dyke; six specimens Lagunitas, Marin Co., Calif., June 25, 1924, E. H. Nast; two from Berkeley, Calif., Sept. 23, 1915, E. C. Van Dyke. Holotype in California Academy of Science. Paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate LXXXV.)

California: San Mateo Co., Moss Beach, R. L. Usinger (Usinger); Stanford University, 3 males, 2 females; Palo Alto, April 27, 1892, 1 male; San Francisco, Holden (Uhler), 1 male; same place, April 30, 1911, J. A. Kusche (Van Duzee), 1 male; same place, July 9, 1911, E. C. Van Dyke (Calif. Acad.), 1 male; Berkeley, Sept. 23, 1915, E. C. Van Dyke (Calif. Acad.), 1 female; Contra Costa Co., Vinehill, July 5-10, 1911, F. E. Blaisdell, 1 male, 2 females; Del Monte, Jan. 6, 1924, L. S. Slevin, 1 male; Marin Co., Lagunitas, June 25, 1924, E. H. Nast (Van Duzee), 1 male, 5 females; Modoc Co., Davis Cr., July 13, 1922, C. L. Fox (Van Duzee), 1 male.

Cenocorixa expleta (Uhler)

(Plate LXXXVI, figs. 4, 4a-4c)

1895. *Corisa expleta* Uhler, P. R., *in* Gillette, C. P. and Baker, C. F. Hemiptera of Colorado, Colo. Agri. Exp. St Bull. XXXI, Tech. ser. 1, pp. 63-64 (desc. 2 ♀♀, Colorado).

1909. *Arctocorisa expleta*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc Ent. Soc. Wash. X, p. 195.

1910. *Arctocorisa expleta*, Smith, J. B. Cat. Ins of N. J, p. 169 *in* Annual Rept. N. J. State Mus 1909. (Lists N. J. but probably an error in det)

Size: Length 6.5 mm. to 7.1 mm. Width of head across eyes 2 mm. to 2.3 mm.

Color: General facies medium brown. Pronotum crossed by 10 to 11 irregular, often broken, dark lines, much narrower than the pale interspaces. Claval pattern consisting of narrow transverse, often broken or furcate, dark lines basally. Pattern of distal portion of clavus and of corium and membrane reticulate, consisting of short, wavy, dark figures. Membrane and corium indistinctly separated by pale line. Embolium, head, legs and venter pale.

Structural characteristics: Head of male about two-thirds as long as pronotal disk; interocular space greater than the width of an eye; vertex of male considerably produced beyond eye margins, that of female slightly produced; facial hairs few in male, numerous in female; male fovea broad and deep; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 18 : 45 : 20 ♀. Pronotal disk with median carina visible on anterior third; pronotum and hemelytra faintly rastrate, the latter with numerous pale hairs; pruinose area of embolar groove posterior to the nodal furrow equal in length to that of claval suture. Lateral lobe of the prothorax elongate, sides tapering, tip truncate; mesoepimeron narrow with osteole near the tip; metaxyphus about as broad as long, pointed apically. Front leg of female with 14 to 16 lower palmar hairs on pala. Front leg of male: pala broad, dorsal edge curving inward just beyond basal third, peg row broken with 12 pegs in upper apical row and 10 in lower, basal row with 2 pegs spaced wide apart in between, a spinose tumescence at base of pala with about 10 or 12 long spines arising from it; tibia about half as long as pala, with pronounced carina which forms a curved expansion at base of pala above a small pad; femur broad at base with a large patch of about 15 rows of stridulatory pegs on inner surface. Middle leg stout, especially the femur; hind leg relatively slender, the femur with from 4 to 6 spines on dorsal surface. On the ventral side a ridge or raised line separates the pilose area from the smooth area. Comparative measurements of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 50.5 : 36.8 : 47.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88 : 110 : 48. Male asymmetry dextral; strigil large, of about 15 irregular combs. Median lobe of seventh abdominal segment large and rounded. Tip of right clasper not bifurcate. For details of male pala, abdomen and genitalia see Plate LXXXVI, figs. 4, 4a, 4b and 4c. Female abdomen with seventh ventral segment broadly incised at tip.

Comparative notes: The male pala of this species is unique. See drawing on Plate LXXXVI.

Location of types: Uhler described this species from two females, one from Fort Collins, June 25, at light (Baker), and the other, Spring Cañon, April 21 (Gillette). I find two specimens in the Uhler collection, a female numbered 164 and labeled "*Corisa expleta* Uhl., Col." and a red "Co-type U. S. N. M." label. This I designate the lectotype. The other specimen is a male labeled "Colo. 2022." According to Doctor Sailer this is a C. F. Baker number and is listed in notes available at U. S. N. M. as referring to Ft Collins, Colo., July 6, 1896, collected by C. F. Baker at light. Therefore this specimen could not have been a cotype. I make it the allotype.

Data on distribution: (Plate LXXXV).

CANADA: *Saskatchewan:* Southern Saskatchewan, Feb. 3, 1939, J. E. Moore, 1 male, 5 females; Redberry Lake, 1940, D. S. Rawson, 2 males.

Manitoba: Hartney, July 31, 1937, R. H. Beamer, 1 male.

U. S. A.: *North Dakota:* Tappen, July 23, 1937, C. L. Johnston, 1 male, 1 female; Devil's Lake, July 5, 1921, C. Thompson (Mich. Coll.), 4 males, 3 females; same place, collector and collection, July 13, 1919, 1 male, 7 females; same place, July 22, 1920, T. H. Hubbell, 3 males, 1 female; Bettineau, Aug. 12, 1920, A. H. Eastgate, 1 male; Ramsey Co., Devil's Lake, Aug. 29, 1922, T. L. Hankinson (Exch. from Mich. Univ.), 4 males, 4 females; Ramsey Co., Devil's Lake, Aug. 29, 1922, same collector, 8 males, 22 females; Nelson Co., Stump Lake, July 23, 1919, C. Thompson, 1 male, 3 females.

Colorado: (Uhler Coll.) 1 male, 1 female.

Cenocorixa wileyæ (Hungerford)

(Plate LXXXVI, figs. 3, 3a-3c; wash drawing No. 39, Plate VII)

1926. *Arctocorixa wileyi* Hungerford, H. B. Can. Ent., Vol. LVIII, pp. 271-272, Pl. on p. 269, figs. 4 and 5 (desc. from Utah).

1930. *Arctocorixa wileyi*, Hungerford, H. B. Pan-Pac. Ent. VII, p. 26 (records from Oregon and California).

Size: Length 6.7 mm. to 7.8 mm. Width of head across eyes, 2.1 mm. to 2.4 mm.

Color: General facies light to medium. Pronotum crossed by 12 to 14 fine, broken, overlapping and anastomosing, irregular dark lines, narrower than pale interspaces. Pattern of clavus and corium reticulate, the dark pattern consisting of short, fine, wavy lines irregularly placed, and on clavus more or less transverse. Membrane and corium not distinctly separated. Embolium, head and limbs generally pale; venter pale to smoky.

Structural characteristics: Head about half as long as pronotal disk; interocular space greater than the width of an eye; vertex of male, seen from above, produced beyond margins of eyes; facial hairs few; male fovea shallow but broad, attaining eyes laterally; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 22 : 18 : 38 : 27 ♂; 1 : 2 : 3 : 4 :: 25 : 18 : 40 : 28 ♀. Lateral angles of pronotal disk somewhat rounded to right angled; median carina plainly visible on anterior third; pronotum and hemelytra faintly rastrate; pruinose area of embolar groove posterior to nodal furrow equal in length to the pruinose area of the claval suture. Lateral lobe of prothorax elongate, sides parallel, tip truncate; mesoepimeron narrow with osteole near tip; metaxyphus as broad as long, apex pointed. Front leg of female of typical shape with about 15 hairs in lower palmar row. Front leg of male: pala broad, dorsal edge bent inward at about the middle, about 33 pegs in peg row, small basally and in a nearly straight line, larger beyond middle and in a crowded, doubly curved line; outside of pala with carina on basal half; tibia about two-thirds as long as pala, with a pronounced dorsal ridge or carina and a rounded pad; femur stout with lower margin medianly expanded, and with 10 rows of stridulatory pegs on inner basal surface. Middle and hind legs relatively slender; hind femur with from 4 to 6 short spines on dorsal surface; relative measurements of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 47 : 35.6 : 38.4. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.8 : 111 : 51.1. Male asymmetry dextral; strigil small, of about 5 regular combs. Median lobe of seventh abdominal segment a triangular plate. Right clasper of male genital capsule not bifurcate at tip; hooklike. For details of male pala, abdomen and genitalia see Plate LXXXVI, figs. 3, 3a, 3b and 3c. Female abdomen with the incision at tip of seventh ventral abdominal segment broad.

Comparative notes: The male pala with the distal end of the peg row in a sigmoid curve readily separates this species from its nearest relatives.

Location of types: Described from a male taken in Wasatch Mts., Utah, by Mrs. Grace Wiley, July 27, 1921. This holotype is in the Francis Huntington Snow Entomological Collection, University of Kansas. An allotype is herewith chosen from a series labeled "Grace Wiley, Emery Co., Utah, July 22, 1921."

Data on distribution: (Plate LXXXV.) We have before us the following:

U. S. A.: *Washington:* Mason Co., L. Cushman, July 12, 1919, F. M. Gaige, 2 males; Yoncalla, July 12, 1935, R. H. Beamer, 2 males.

Oregon: Grant Co., Strawberry Lake, July 17, 1936, R. E. Rieder, 2 males, 2 females; North Powder, July 13, 1931, L. D. Anderson, 2 males; Boardman, July 15, 1931, same collector, 1 female; Florence, July 11, 1935, R. H. Beamer, 2 males, 1 female; Worden, July 1, 1935, same collector, 5 males, 4 females; Modoc Point, July 11, 1935, same collector, 4 males; South of Worden, July 1, 1935, P. W. Oman (U. S. N. M.), 2 males, 6 females; Harney Co., June 23, 1922, E. C. Van Dyke (Calif. Acad.).

California: Mammoth Lakes, July 29, 1940, L. C. Kuitert, 8 males, 7 females; Lake Tahoe, July 11, 1940, same collector, 2 males; Bishop, July 28, 1940, same collector, 1 male, 1 female; Big Bear Lake, July 26, 1932, R. H. Beamer, 22 males, 10 females; Alpine, July 9, 1929, Beamer and Oman, 5 males, 21 females; San Diego Co., July 4, 1929, L. D. Anderson, 8 males, 1 female; same place, April 9, 1930, C. D. Martin, 3 males, 9 females; San Jacinto Mts., July 21, 1929, P. W. Oman, 1 female; Lone Pine, April 5, 1937, E. C. Van Dyke, 1 male; Bray, June 28, 1935, R. H. Beamer, 1 male; Eagle L., Lassen Co., July 31, 1921, J. O. Martin, 1 male; Franklin, March 11, 1921, B. G. Thompson, 2 females (U. S. N. M.); Beaumont, Oct. 17, 1930, C. H. Hicks (Lutz); San Antonio Canyon, Ontario, July 25, 1907 (Drake); Benton, Oct. 7, 1942, P. A. McKinstry, 11 males, 1 female (taken from a hot spring, water near boiling point, all specimens dead); Sonora, Tuolemne Co., Nov. 15, 1932, E. P. Van Duzee (Calif. Acad.).

Nevada: Carson City, Aug. 9, 1929, R. H. Beamer, 1 female; Ely, Aug. 13, 1940, L. C. Kuitert, 3 males, 1 female; Reno, Oct. 1939, La R., 1 male, 1 female; Reno, Aug. 15, 1936, Owen Bryant (Bryant); (Uhler Coll.), 3 males, 3 females.

Utah: Wasatch Co., July 27, 1921, Grace Wiley, 1 male; Emery Co., July 30, 1922, Grace Wiley, 3 males, 3 females; Duchesne, Aug. 17, 1940, L. C. Kuitert, 5 males, 2 females; Emery Co., July 22, 1921, Grace Wiley, 1 male, 2 females; same place and collector, Aug. 2, 1921, 1 male, 6 females; same place and collector, Sept 17, 1921, 1 male, 23 females; Cisco, Sept. 28, 1921, same collector, 1 male, 4 females; Eastern Utah, Sept. 28, 1922, same collector, 1 male, 2 females; Sardine Canyon, Aug. 3, 1935, C. F. Smith (Utah Exp. Sta. Coll.), 1 male, 2 females; Washington Co., St. George (Brooklyn Mus. Coll.), 2 females.

Arizona: Coconimo Co., July 1, 1929, Beamer and Anderson, 5 males, 5 females; Gila Co., Miami, July 22, 1932, R. H. Beamer, 7 males, 5 females; Kaibab Forest, Aug. 9, 1936, M. B. Jackson, 11 males, 17 females; Maricopa Co., July 1, 1929, R. H. Beamer, 1 female; Huachuca Mts., 7,000 ft., July, G. Beyer, 1 female; Coconimo Co., July 1, 1929, R. H. Beamer, 4 males, 5 females.

New Mexico: Ft. Defiance (Uhler Coll.), 3 males, 1 female.

Colorado: Caisson, July 1, 1931, L. D. Anderson, 1 male, 4 females; El Paso, July 8, 1921, Grace Wiley, 1 female; Placer Co., 1 male.

Cenocorixa utahensis (Hungerford)

(Plate LXXXVII, figs. 3, 3a-3c)

1925. *Arctocorixa utahensis* Hungerford, H. B. Bull Brooklyn Ent. Soc, XX, pp. 22-23, Pl. II, fig. 7 (desc. from Utah).

1928. *Arctocorixa utahensis,* Hungerford, H. B. Can. Ent LX, pp. 229-230 (comp. note).

1928. *Arctocorixa utahensis,* Hungerford, H. B. Ent. News, XXXIX, p. 156 (records from Torrence Co., N. M.).

1930. *Arctocorixa utahensis,* Hungerford, H. B. Pan-Pac. Ent., VII, p. 26 (records Cal. at 10,500 ft. elev.).

Size: Length 6.9 mm. to 7.8 mm. Width of head across eyes 2.1 mm. to 2.4 mm.

Color: General facies lighter than the medium. Pronotum crossed by 9 or 10 fairly regular, sometimes broken, very narrow dark lines. Color etched away at outer edges of pronotum and along inner basal angles of clavi. Pattern of clavus and corium consisting of narrow, broken dark lines arranged in irregularly transverse series. Membrane and corium sometimes faintly separated by a pale line. Embolium, head, and limbs pale. Venter pale to smoky.

Structural characteristics: Head about half as long as pronotal disk; interocular space greater than the width of an eye; vertex of male, seen from above, somewhat produced beyond eye margins; facial hairs few; male fovea shallow, broad, usually not quite attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 18 : 45 : 27 ♂ ; 1 : 2 : 3 : 4 :: 24 : 18 : 47 : 28 ♀. Pronotal disk with median carina visible on anterior third; pronotum and hemelytra faintly rastrate; pruinose area of the embolar groove posterior to the nodal furrow equal to that of the claval suture. Lateral lobe of prothorax elongate, tip truncate; mesoepimeron narrow with osteole near the end; metaxyphus as broad as long, apex pointed. Front leg of female of typical shape, with 14 or 15 lower palmar hairs. Front leg of male: pala broad, about 28 pegs in a single, curved row, dorsal edge curved inward about two-thirds of way from base, outside of pala with ridge on basal half; tibia about two-thirds as long as pala, dorsal carina pronounced, with a small pad; femur stout, lower margin somewhat rounded, dorsal one straight, with about 8 or 9 rows of stridulatory teeth on inner surface. Middle and hind legs slender; middle femur not spinose; hind femur with one or two rows of spines on dorsal surface; segmental proportions: Middle leg: femur : tibia : tarsus : claw :: 100 : 52.4 : 35.4 : 38.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 87.5 : 117.5 : 50. Male asymmetry dextral; strigil large, of 10 regular combs; median lobe of seventh abdominal segment rounded. Right clasper of male genital capsule bifurcate at tip, the processes slender. For details of male pala, abdomen, and genitalia see Plate LXXXVII, figs. 3, 3a, 3b, and 3c. Female abdomen with broad incision at tip of seventh ventral segment.

Comparative notes: The rather large strigil of the male separates this species from *C. bifida* and *C. kuiterti.*

Location of types: Described from 34 specimens taken by Grace Olive Wiley in Emery Co., Utah, in July, August and September, 1921. Holotype male, allotype female, and some paratypes in Francis Huntington Snow Entomological Collections, University of Kansas. Paratypes in the U. S. National Museum and private collections of Mrs. Grace Wiley, J. R. de la Torre-Bueno and R. F. Hussey.

Data on distribution: (Plate LXXXV.) The published records are Utah, New Mexico and California. We have studied the following:

CANADA: *British Columbia:* Windermere, Sept. 17, 1928, Owen Bryant (Bryant); Copper Mt., Oct. 11, 1928, G. S. Smith; same place and collector, Oct. 25, 1928; Brent Lake, Summerland, Oct. 29, 1931, A. N. Gartrell; Penicton, Oct. 14-22, 1931, same collector, latter four records from G. S. Walley.

Alberta: Macleod, Sept. 15, 1928, Owen Bryant (Bryant); Cypress Hills, July 21, 1930, J. H. Pepper; New Dayton, July 10, 1930, same collector; Crow's Nest Pass, Aug. 29, 1930, same collector, these three records from G. S. Walley; Banff, Aug. 10, 1925, Owen Bryant (Bryant Coll.), 1 male.

Manitoba: Hartney, July 31, 1937, R. H. Beamer, 1 female.

U. S. A.: *Oregon:* So. Worden, July 1, 1935, P. W. Oman (U.S.-N.M.), 3 females.

California: Sloan's Lake (Uhler Coll.), 1 male; Fresno Co., Red Lake, 10,500 ft., E. C. Van Dyke (Calif. Acad.), 2 males, 1 female.

Idaho: Burley, July 6, 1931, L. D. Anderson, 1 male, 1 female; Snake R. (Uhler Coll.), 1 female.

Nevada: Ely, Aug. 13, 1940, L. C. Kuitert, 4 males, 6 females; (Uhler Coll.), 1 female.

Utah: Cisco, Sept. 28, 1921, Grace Wiley, 4 males; Emery Co., July 30, 1922, same collector, 11 males, 9 females; Eastern Utah, Sept. 28, 1921, same collector, 1 male; Wasatch Mts., July 27, 1921, same collector, 1 female; Emery Co., July 22, 1921, same collector, 1 male, 13 females; same place and collector, July 8, 1921, 2 males; same place and collector, Aug. 2, 1921, 1 female; same place and collector, Sept. 15, 1921, 6 females; same place and collector, Sept. 17, 1921, 1 male, 5 females; Beaver Canyon, July 6 (Brooklyn Mus. Coll.), 1 female; Wellsville, Aug. 16, 1934, Knowlton and Smith (Utah Exp. Sta. Coll.), 2 females; Promontory, Sept. 4, 1930, Knowlton and Janes (same collection), 1 male.

Arizona: Huachuca Mts., 7,000 ft., August G. Beyer, 2 males, 1 female; Patagonia, Barnum Brown, 1 male; Bright Angel, 6,880 ft., July, Aug., 1906, Calvert (Phila. Acad.); Williams, Barber and Schwartz (Barber Coll.), 1 male, 1 female; Chiricahua Mts., July 5, 1940, L. C. Kuitert, 2 males, 5 females; Coconimo Co., July 1, 1929, Anderson and Beamer, 14 males, 20 females; Kaibab Forest, Aug. 9, 1936, M. B. Jackson, 2 males, 9 females; Quartzsite (Bueno Coll.), 3 males, 2 females; Flagstaff, July 8, 1941, E. L. Todd, 1 male, 6 females; Miami, July 22, 1932, R. H. Beamer, 1 male, 1 female; Yavapai Co., Aug. 9, 1927, R. H. Beamer, 1 male; Phoenix, Torre-Bueno (Bueno Coll.), 1 female; Foxborough Ranch, Aug. 1, 1936, Owen Bryant (Bryant).

New Mexico: Raton, Aug. 6, 1933, Rodeck and James, 1 male; Socorro, Aug. 18, 1927, P. A. Readio, 1 male; Ft. Wingate, June, 1 female; Torrence Co., summer 1925, C. A. Martin; Wagonmound, July 18, 1936, M. B. Jackson, 1 male; Santa Fe, July 20, 1936, R. H. Beamer, 10 males, 7 females; (Uhler Coll.), 1 male; Galisteo Cr., April 1, 1932 (Lutz).

Colorado: Mineral Co., Continental Divide, June 20, 1919, 1 male; Ft. Collins, May 22, 1900 (Abbott Coll.), 1 male; Hadley, Sept. 22, 1927, P. A. Readio, 1 male; Gould, Aug. 20, 1940, H. C. Severin (Severin); Pingree Park, Aug., 1925, Beamer and Lawson, 1 male, 2 females; Las Animas Co., Aug. 22, 1927, R. H. Beamer, 4 males, 1 female; Caisson, July 1, 1931, L. D. Anderson, 4 males, 6 females; Estes Park, Mary's Lake, Aug. 22, 1919, H. B. Hungerford, 23 males, 24 females; Phantom Canyon, Aug., 1919, H. B. Hungerford, 1 male, 1 female; (Uhler Coll.), 1 female; Hillside, 6 mi. S., Aug. 25, 1941, H. C. Severin (Severin).

Texas: Randall Co., July 7, 1927, R. H. Beamer, 1 male.

Kansas: Cheyenne Co., July 1, 1936, R. H. Beamer, 1 male; Thomas Co., 3,150 ft., F. X. Williams, 2 males, 2 females; Decatur Co., July 8, 1923, R. H. Beamer, 2 females; Norton Co., July 5, 1925, H. J. Grady, 1 female; Pratt Co., April 12, 1925, R. H. Beamer, 1 female; Meade Co., 2,500 ft., F. X. Williams, 1 female; Morton Co., Aug. 3, 1924, C. O. Bare, 1 female; Scott Co., June 22, 1925, R. H. Beamer, 1 female; Douglas Co., H. B. Hungerford, 3 females; same place, Oct. 28, 1921, Robert Guntert, 1 male, 2 females.

North Dakota: L. Metagoshe, July 30, 1937, R. H. Beamer, 1 female; Tappen, July 23, 1937, same collector, 2 males, 2 females.

South Dakota: Clear Lake, Aug. 11, 1939, H. C. Severin, 3 males, 3 females; Brookings Co., Lake Oakwood, Aug. 11, 1939, same collector, 2 males; Brookings, Gravel Pit, Sept. 11, 1939, same collector, 1 male, 4 females; Roslyn, Sept. 14, 1939, same collector, 1 male, 1 female; Webster, same date and collector, 1 male, 1 female; Burdette, July 20, 1937, C. L. Johnston, 1 female; Piedmont, July 17, 1937, Beamer and Johnston, 32 males, 14 females; Weta, July 18, 1937, Beamer and Peters, 8 males, 15 females; Wasta, July 17, 1937, R. H. Beamer, 2 males, 1 female; Draper, July 19, 1937, same collector, 3 males, 7 females; Pine Ridge, June 17, 1941, H. C. Severin (S. Dak.); Dixon, June 14, 1940, same collector and collection; Rapid City, June 22, 1940, same collector and collection; Pickerel Lake, Sept. 14, 1939, same collector and collection; Clear Lake, Aug. 11, 1939, same collector and collection; Eureka, June 22, 1939, same collector and collection; Wessington, June 20, 1939, same collector and collection; Vivian, same date, collector and collection; Wood, July 23, 1939, same collector and collection; Waubay, Blue Dog Lake, Sept. 14, 1939, same collector and collection; Weta, July 18, 1937, R. H. Beamer, 1 female; Wasta, July 17, 1937, same collector, 10 females; same place and date, H. T. Peters, 2 females; Draper, July 19, 1937, R. H. Beamer, 4 males, 7 females; Piedmont, July 17, 1937, C. L. Johnston, 1 female.

Iowa: Dickinson Co., June 29, 1940, 1 male

PLATE LXXXVI

Cenocorixa new genus

FIG. 1. *Cenocorixa blaisdelli* (Hungerford); dorsal view of male abdomen.
FIG. 1a. Genital capsule of male.
FIG. 1b. Right clasper of male, enlarged.
FIG. 1c. Pala of male.
FIG. 2. *Cenocorixa andersoni* n. sp.; dorsal view of male abdomen
FIG. 2a. Genital capsule of male.
FIG. 2b. Right clasper of male, enlarged.
FIG. 2c. Pala of male.
FIG. 3. *Cenocorixa wileyæ* (Hungerford); dorsal view of male abdomen.
FIG. 3a. Genital capsule of male.
FIG 3b. Right clasper of male, enlarged.
FIG. 3c. Pala of male.
FIG 4. *Cenocorixa expleta* (Uhler); dorsal view of male abdomen
FIG. 4a. Genital capsule of male.
FIG. 4b. Right clasper of male, enlarged.
FIG. 4c. Pala of male.

PLATE LXXXVI

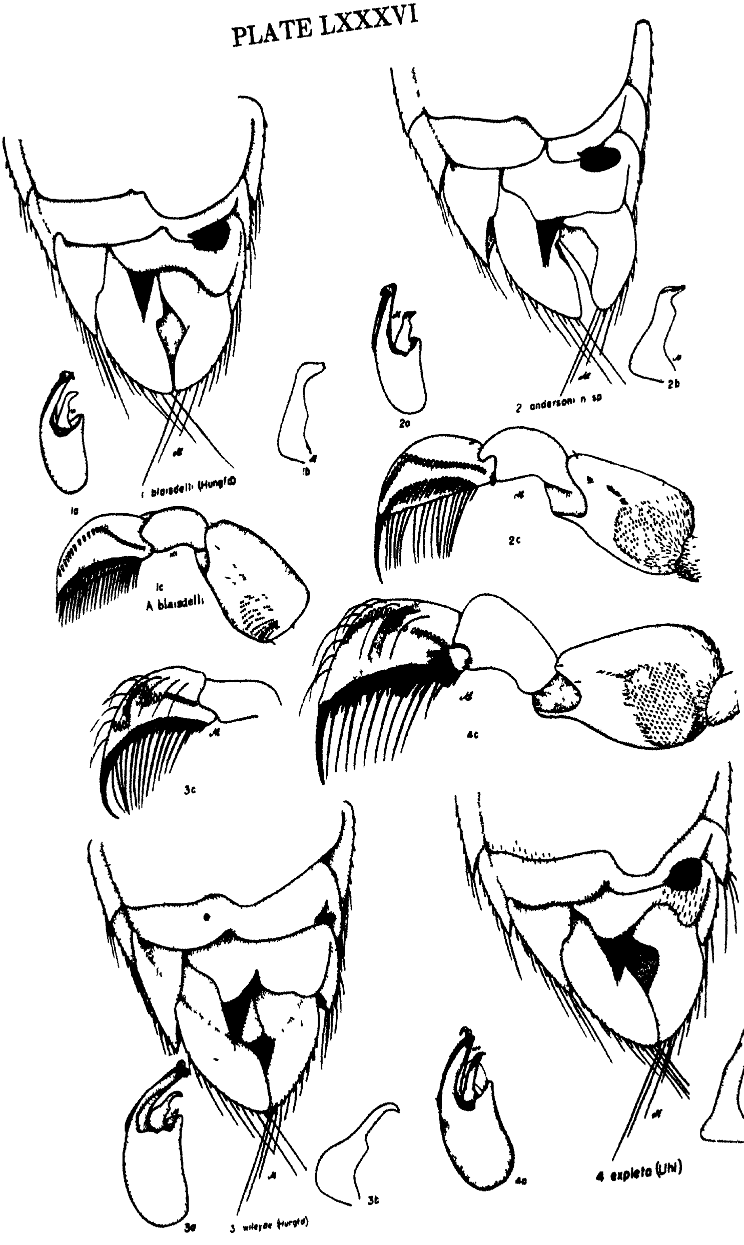
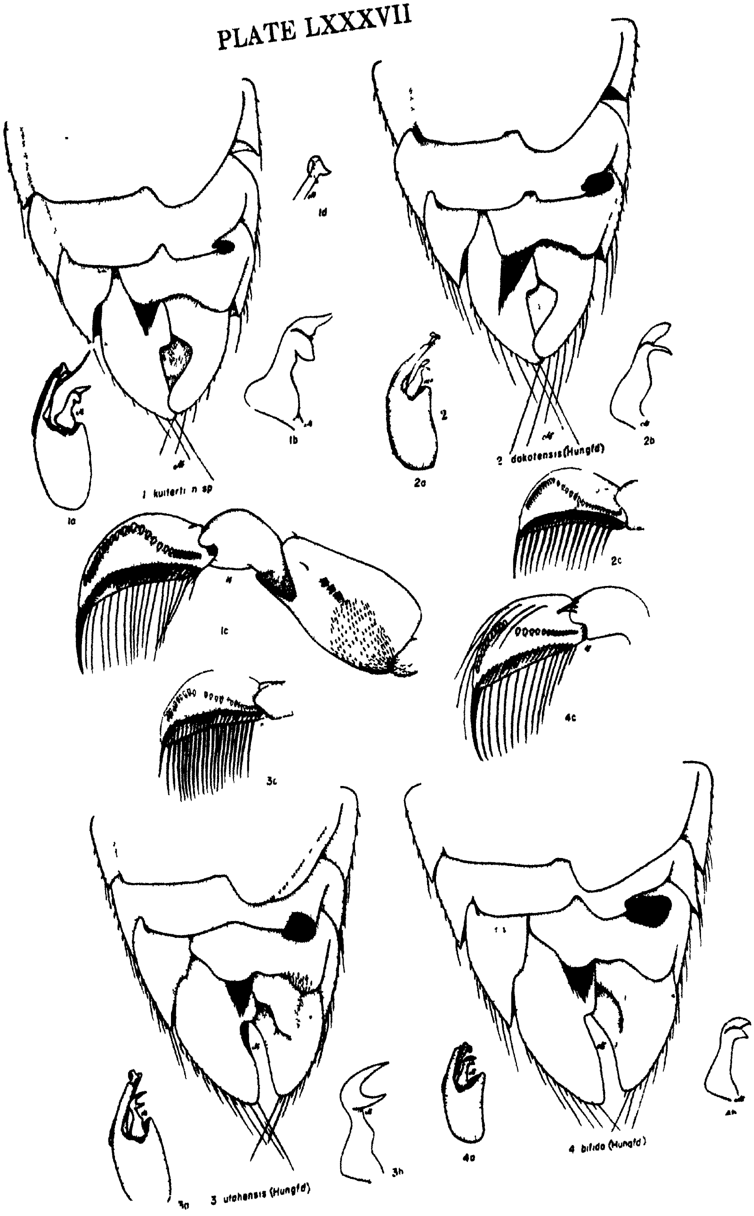


PLATE LXXXVII

Cenocorixa new genus

FIG. 1. *Cenocorixa kuiterti* n. sp.; dorsal view of male abdomen
FIG. 1a. Genital capsule of male.
FIG. 1b. Right clasper of male, enlarged.
FIG. 1c. Pala of male.
FIG. 1d. Tip of penial sheath of male genital capsule.
FIG. 2. *Cenocorixa dakotensis* (Hungerford); dorsal view of male abdomen.
FIG. 2a Genital capsule of male.
FIG. 2b. Right clasper, enlarged.
FIG. 2c. Pala of male.
FIG. 3. *Cenocorixa utahensis* (Hungerford); dorsal view of male abdomen.
FIG. 3a. Genital capsule of male.
FIG. 3b. Right clasper of male, enlarged.
FIG. 3c. Pala of male.
FIG. 4 *Cenocorixa bifida* (Hungerford); dorsal view of male abdomen.
FIG. 4a. Genital capsule of male.
FIG. 4b. Right clasper of male, enlarged.
FIG. 4c. Pala of male.

PLATE LXXXVII



Arctocorisa Wallengren

1894. Wallengren, H. D. J. Ent. Tidskr. XV, pp. 138, 159. [As subg. of *Corisa* for his *C. variegata* (= *C. germari* Fieb.) and *C. carinata* Sahlb.]

1898. Kirkaldy, G. W. Ent. XXXI, pp. 252-253. (>*Arctocorisa* Wallengren which he included in his subg. *Basileocorixa*.)

1901. Kirkaldy, G. W. Jl. Quekett Micros. Club, ser. 2, No. 48, p. 41

1906. Kirkaldy, G. W Ent. XXXIX, p. 62. (>*Arctocorisa* Wallengren.)

1906. Kirkaldy, G. W. Trans. Amer. Ent. Soc. XXXII, p. 152. Type *carinata* J. Sahlb. (>*Arctocorisa* Wallengren.)

1908. Kirkaldy, G. W. Can. Ent XL, No 4, p. 118. (>*Arctocorisa* Wallengren.)

1909. Kirkaldy, G. W., and Torre-Bueno, J R. de la. Catalogue *in* Proc Ent. Soc. Wash. X, p. 198. (>*Arctocorisa* Wallengren.)

> The expanded *Arctocorisa* (or *Arctocorixa*) of Kirkaldy has been used by Kirkaldy and Bueno 1909, Oshanin 1912, Abbott, Van Duzee, Hungerford, Lundblad, Walley, Blatchley, Parshley and others thereafter. Jaczewski 1924 says "Wallengren 1894 founded the generic name *Arctocorisa* for the species possessing a strigil and having the copulatory apparatus, directed to the right." This is not true for Wallengren in the same paper placed most of such species in what he called "*Corisa* B. White." Schumacher 1924 revived *Sigara* Fabr. and Poisson 1935 placed *A. carinata* and *A. germari* under *Sigara* (*Sigara*) as does Stichel. Wagner 1937 treated *Arctocorisa* Wallengren as synonym of *Sigara* Fabr. So does China 1938. Walton 1940 restored *Arctocorisa* Wallengren as a subgenus of *Corixa sens. lat.*

1940. Walton, G. A. Trans. Conn. Acad. Arts and Sci. XXXIII, p. 345.

1940. Hutchinson, G. E. Trans. Conn. Acad. Arts and Sci. XXXIII, p. 415. [*Corixa* (*Arctocorisa*) *kesar* sp. n. and figures *A. chanceae* Hungfd., figs 235-241, and *A. convexa* (Fieb.), figs 228-234, p. 424.]

1942. Walton, G. A. Trans. Royal Ent. Soc London (2) XCII, p. 437 [*Corixa* (*Arctocorixa*) *germari* Fieber and *Corixa* (*Arctocorixa*) *carinata* Sahlberg].

1943 China, W. E. The Generic Names of British Insects, Pt. 8. British Hemiptera Heteroptera, pp. 283, 306 [*Corixa* (*Arctocorisa*) *carinata* Sahlb. and *germari* Fieb].

From the above it will be observed that all of us followed Kirkaldy's expanded *Arctocorisa* rather than Wallengren. Walton 1940, without redefining *Arctocorisa* Wallengren, places it as a subgenus of *Corixa sens. lat.*, and Hutchinson, in the same paper, definitely treats *Arctocorisa* in the Wallengren concept. Since in the Wallengren concept both males and females can be assigned to the group, I prefer to use *Arctocorixa* as a genus. It contains seven species that are closely related and all of them boreal in distribution, the southern extensions being at high elevations.

Arctocorisa may be defined as follows: Moderately elongate species more than 7 mm. long. Pronotum moderately long with median longitudinal carina visible throughout its length and crossed by ten or more brown lines. Hemelytral pattern of broken, small irregular figures more or less reticulate except at base of clavus. Face with long hairs in both sexes, those of male often procumbent and inconspicuous. Pubescence of hemelytra very long. Metaxyphus narrow, pointed. Abdominal tergite of male markedly lobed behind the strigil. Last ventral abdominal segment of female distinctly incised at tip. Anterior tibia moderately long and in the males carinate on dorsal edge. Pala elongate except in *A. chanceæ* Hungerford. Logotype: *C. carinata* Sahlb.

KEY TO *ARCTOCORISA* WALLENGREN

1. Pala of male with two rows of pegs.......... ....*A. chanceæ* Hungfd (see p. 589)
Pala of male with one row of pegs.......... 2
2. (1) Male strigil very large (see fig 8, Plate LXXXVIII) 3
Male strigil not as above.......... 4
3 (2) Right clasper of male plainly furcate at tip..... ....*A. germari** (Fieber) (see p. 591)
Right clasper of male *not* or not plainly furcate at tip. . .. *A sutilis* (Uhler) (see p. 593)
4. (2) Male pala with pegs widely spaced in the middle of the row *A. carinata** (Sahlb.) (see p 596)
Male pala with pegs not widely spaced in the middle of the row 5
5. (4) Male pala strongly curved, the tibial carina thin. Strigil moderately large, circular; vertex prominent . . .. *A convexa* (Fieber) (see p. 598)
Male pala moderately curved, the tibial carina not thin, strigil normal . . 6
6 (5) Male clasper as in figure 2b, Plate LXXXVIII. Claw and tarsus of middle leg equal in length . . . .*A. lawsoni* n sp. (see p 600)
Male clasper as in figure 4b, Plate LXXXVIII Claw of middle leg plainly longer than tarsus . . . . *A. planifrons* (Kirby) (see p. 601)

Arctocorisa chanceæ Hungerford

(Plate LXXXIX, figs. 1, 1a-1d)

1927. *Arctocorixa chanceæ* Hungerford, H B. Annals Ent Soc Amer. XIX, p. 462, Pl. XXXIV, figs. 2 and 5 (desc from Alaska).

1930. *Arctocorixa chanceæ*, Walley, G. S. Can Ent. LXII, No. 4, p. 77 (records Quebec, north shore of Gulf of St. Lawrence)

1930. *Arctocorixa chanceæ*, Walley, G S. Can. Ent LXII, No 12, p. 281 (repeats above records)

1931. *Arctocorixa chanceæ*, Walley, G S Can. Ent. LXIII, No. 10, p 238 (from stomach Arctic grayling near mouth Churchill River, Manitoba)

1940. *Corixa (Arctocorisa) chanceæ*, Hutchinson, G E Trans. Conn. Acad. Arts and Sci, XXXIII, p. 424, Pl. XVII, figs. 235-241.

1943. *Arctocorixa chanceæ*, McClure, H. Elliott Ecological Monographs XIII, p. 14 (Manitoba, Canada. Permanent pools, eggs early June, adults early August).

Size: Length 8.5 mm. to 9 mm. Width of head across eyes 2.3 mm. to 2.7 mm.

Color: General facies dark. Pronotum crossed by 11 to 12 very irregular dark bands about equal in width to pale spaces. Pattern of clavus and corium reticulate, obscure, the dark color dominant over light, faintly longitudinal on corium; membrane separated from corium by a pale line. Embolium, head, and limbs pale; venter black with pale margins.

Structural characteristics: Head about half as long as the pronotal disk; interocular space greater than width of an eye; vertex of male conically produced beyond eye margins; face moderately hairy in both sexes; male fovea well defined, broad and deep; an-

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* Not American.

tennal segmentation: 1 : 2 : 3 : 4 :: 28 : 19 : 45 : 38 ♂; 1 : 2 : 3 : 4 :: 28 : 20 : 48 : 38 ♀. Pronotal disk with pronounced median carina on anterior half but visible throughout; tip of disk pointed; pronotum and hemelytra moderately rastrate, the latter with a few pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax about two-thirds as broad at base as long, sides tapering, apex truncate; mesoepimeron narrow with osteole near the tip; metaxyphus about as broad at base as long, but sides abruptly tapering to a narrow point. Front leg of female: pala and tibia of usual shape; femur hairy at base for only one-fourth its length and with a row of stout spines extending from apical edge of pilose area to apical margin of femur. Front leg of male: pala broadest at base, tapering to point apically; pegs in two rows, basal row of 12 pegs lying close to upper palmar row of bristles, apical row of 17 pegs lying along dorsal margin, two or three pegs in middle, connecting the two rows; small carina at base of pala on dorsal margin; tibia about three-fourths as long as pala, with pronounced dorsal carina and a pad; femur relatively slender with about six rows of stridulatory pegs on inner surface and a row of stout spines extending from these pegs to apical margin of femur. Middle and hind legs relatively slender; middle femur not spinose; hind femur with row of short spines on dorsal surface; comparative measurements of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 45.8 : 32.7 : 32.7. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.8 : 145.5 : 51. Male asymmetry dextral; strigil large, suboval, of about 17 irregular combs; right clasper of genital capsule bifurcate at tip, processes slender. For details of male pala, abdomen, and genitalia see Plate LXXXIX, figs. 1, 1a, 1b and 1d. Female abdomen with seventh ventral segment incised at tip as in Plate LXXXIX, fig. 1c.

Comparative notes: This is the only species in the genus with two peg rows in the male pala. The female has broader lobes of the seventh ventral abdominal segment and a deeper, narrower median incision.

Location of types: Described from one male taken in Kobuk River, Noorvik, Alaska, Aug. 6, 1925, by P. Scott. Holotype in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XC.) Mr. Walley has reported this from the provinces of Quebec and Manitoba, Canada. We have the following:

ALASKA: Noorvik, Kobuk R., Aug. 6, 1925, P. Scott, 1 male (the type).

CANADA: *Manitoba:* Churchill, Feb. 9, 1937, D. G. Denning, 2 females; Lake Isabella, Churchill, June 9, 1936, H. E. McClure, 2 males.

Quebec: Watshishu, June 18, 1929, W. J. Brown, 1 male.

Newfoundland: Via Walton, 4 males, 1 female.

Arctocorisa germarii (Fieber)

(Plate LXXXVIII, figs. 3, 3a-3c)

1848. *Corisa germarii* Fieber, F. X. Bull. Soc. Imp des Nat. Moscou, XXI, Pt. 2, p. 531 ("Aus Sachsen. Unalaschka," a mixed lot).

1851 *Corisa germarii*, Fieber, F. X Species Generis Corisa . . . , p 38, Pl. II, No. 26.

1860. *Corisa germarii*, Fieber, F. X. Europ. Hemiptera, p. 99.

1876 *Corixa germarii*, Uhler, P. R. Bull. U. S. Geol and Geog. Surv. Terr., No 5, Vol. I, p. 341; also reprint of above separately paginated p. 75 (quotes Fieber).

1879. *Corisa germarii*, Puton, A Synopsis des Hem -Het. de France, 1, p. 234 (taken from Van Duzee Catalogue)

1898. *Corixa germari*, Kirkaldy, G W. Ent. XXXI, pp. 249-251 (gives syn and compares with *C. carinata* Sahlb.).

1900. *Corisa germarii*, Heidemann, O. Proc Wash Acad. II, p. 506 (records 4 ♂ ♂, 5 ♀ ♀ from Popof Isl. and quotes Fieber). These are *A. sutilis* (Uhl.).

1901. *Corixa* (*Arctocorisa*) *germari*, Kirkaldy, G. W. Jl. Quekett Micros. Club, ser. 2, VIII, No. 48, p. 48 (figs. male pala).

1909. *Arctocorisa germari*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la Catalogue *in* Proc. Ent. Soc Wash. X, 1908, p. 195 (not the Alaska record).

1917. *Arctocorixa germarii*, Van Duzee, E. P. Catalogue of Hemiptera . . . , p. 480 (not Alaska record).

1923. *Arctocorisa germari*, Lundblad, O. Ent. Tidskrift XLIV, pp. 67-70 (dist. note).

1923. *Arctocorisa germari*, Hutchinson, G. E. Scottish Naturalist, p. 190 (South Ebudes).

1925. *Arctocorisa germari*, Lundblad, O. Ent. Tidskrift XLVI, Haft 2, pp. 127-142, text figs. 1, 2 and 3, Pl V (see for synonomy).

1930 *Arctocorisa germari*, Jones, H. P. Entomologists' Record, XL-XLII; reprint, p. 76

1931. *Sigara germari*, Lundblad, O. Zool. Anzeiger XCVI, Heft 3-4, p. 87.

1932. *Corixa germari*, Day, F. H Ent. Mo. Mag LXVIII, No. 815, p. 87 (in Cumberland).

1933 *Sigara* (*Sigara*) *germari*, Jaczewski, T. Fragmenta Polonici II, Nr. 8, p 12

1935. *Sigara garmari*, Poisson, R. Archives de Zool. Exp. et Gén. LXXVII, fasc 2, p 551, fig. 73 (not American records).

1935. *Sigara* (*Sigara*) *germari*, Stichel, W. Illustrierte Bestimmungs Tabellen der Deutschen Wanzen, Lief. 11, p. 328; also Lief. 12, p. 332.

1936. *Sigara germari*, Lundblad, O. Ent. Tidskrift, Háfte 1, p. 61 (ecol. note).

1936. *Sigara* (*Sigara*) *germari*, Poisson, R. Bull. de la Soc Sci. de Bretagne XIII, fasc. 142, p. 9.

1937. *Sigara germari*, Wagner, Eduard Verhandl. des Ver. f Naturw. Heimatforschung zu Hamburg XXV, p. 63.

1938. *Sigara* (*Sigara*) *germari*, China, W. E. Ent. Mo. Mag. LXXIV, p. 39.

1938 *Sigara germari*, Macon, T. T. Jl. Anim. Ecol. VII, pp. 2, 12.

1938. *Sigara germari*, Michalk, Otto. Sitzungsberichte der Naturforschenden Gesellschaft zu Leipzig LXIII-LXIV, p. 164.

1939. *Sigara garmari*, Jaczewski, T. Fragmenta Faunistica Musei Zool. Polonici III, No. 23, pp. 478-479.

1939. *Sigara germari,* Macon, T. T. Freshwater Biol. Assoc. of British Empire, Sci. Pub. 1, pp. 12, 25, figs. 15b, 21p, 22s.

1939. *Arctocorixa germari,* Pearce, E. J., and Walton, G. A. Trans. Soc. British Ent. VI, Pt. 7, p. 159.

1942. *Corixa (Arctocorixa) germari,* Walton, G. A. Trans. Royal Ent. Soc. London XCII, No. 2, p. 437, figs. a, b, c, d. (Hebrides.)

1944. *Corixa germari*, Brown, J. M. Ent. Mo. Mag. LXXXII, p. 22 (N. Yorkshire, Eng.).

1946? *Corixa germari*, Brown, E. S. Trans. Dumf. and Galloway Nat. Hist. and Antiq. Soc. XXIII, p. 7.

Size: Length 7.4 mm.;[*] width across eyes 2.4 mm. (male). General shape long and slender.

Color: General facies medium brown. Pronotum crossed by 8 to 10 brown bands, the anterior ones more irregular; distal ones tending to coalesce laterally. Base of clavus and corium crossbanded; dark pattern elsewhere irregular with some tendency to coalesce on corium into longitudinal series. Corium and membrane plainly separated by a pale line; pattern of membrane reticulate. Embolium, head, legs, and thoracic venter pale; venter of abdomen smoky to black with lateral and distal margins of segments edged with pale yellow.

Structural characteristics: Head about two-thirds as long as the pronotal disk; interocular space a little broader than an eye as measured by projection; vertex produced; male fovea not quite attaining the eyes laterally; rather shallow; facial hairs not prominent; antennal segmentation: 1 : 2 : 3 : 4 :: 28 : 22 : 44 : 22 ♂. Pronotal disk with pronounced median carina on anterior third but visible throughout; tip of disk rounded; pronotum strongly rastrate, hemelytra less strongly rastrate, tending to be rugulose, especially on corium; hemelytra with numerous long, pale hairs. Postnodal pruinose area about equal to the pruinose area of the claval suture. Lateral lobe of prothorax elongate, rounded distally. Mesoepimeron narrow with osteole near the tip. Metaxyphus small, triangular, about as broad as long. Front leg of male: pala elongate, slender, curving from base to apex with 28 to 30 teeth in an irregular row lying about midway between dorsal margin and the palm (for details see Plate LXXXVIII, fig. 3); tibia slender, about two-thirds as long as the pala, with a pronounced dorso-lateral carina, and a narrow pad; femur relatively slender with about 8 rows of stridulatory pegs near the base on inner surface, followed by a group of elongate, stout hairs. Middle and hind legs slender, hind femur with half a dozen small pegs in a row along dorsal surface; proportions of segments as follows (for one male specimen): Middle leg:

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[*] Stichel says 7.5 mm. to 8 mm. and Macon says 7.5 mm. to 10 mm.; therefore, my specimens must be unusually small.

femur : tibia : tarsus : claw :: 100 : 49.2 : 37.2 : 42.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 91 : 122.1 : 44.4. Male asymmetry dextral; strigil large, suboval, of about 12 to 14 irregular combs. Right clasper of male genital capsule forked at tip. For details of abdomen and genitalia see Plate LXXXVIII, figures 3a, 3b and 3c.

Comparative notes: The American record of this species no doubt is an error and applies to *A. sutilis* (Uhler). These species may be separated by the key and the figures on Plate LXXXVIII.

Location of types: Fieber studied material from Germar's collection and Mus. Berlin from Unalaschka which I did not locate in the European museums I visited, nor did I find any specimens from Sachsen which should be the types.

Data on distribution: In the Snow Collections we have only the following specimens:

ENGLAND: Brackenben, Westmoreland, April 21, 1928, F. H. A. (Exchange Hugh Jones, Nottingham, England), 2 males.

For published records see Lundblad, Poisson, etc.

Arctocorisa sutilis (Uhler)

(Plate LXXXIX, figs 2, 2a-2c, 3, 3a-3d)

1876 *Corixa sutilis* Uhler, P R Bull U. S Geol Geog. Surv. I, p 330; also reprint of above, sep. paginated, p 73 (Collected in mts of Colorado by Lt. Carpenter, July to September)

1877 *Corixa sutilis*, Uhler, P R Bull U S. Geol Geog Surv. III, p 453 (Sloan's Lake, highlands west of Denver, August 5.)

1877 *Corisa sutilis*, Uhler, P. R *in* Wheeler's Report Chief Eng for 1877, p. 1332. (Plains of northern New Mexico, October, Lt. W. L Carpenter.)

1878 *Corisa sutilis*, Uhler, P. R. Bull. U S. Geol. Geog Surv. IV, p 509 (Standing water, Milk River region, Montana.)

1893 *Corisa sutilis*, Uhler, P R. Proc. Ent. Soc. Wash II, p. 384. (3 spec., Alta, Utah, 10,000 ft)

1895 *Corisa sutilis*, Gillette, C. P , and Baker, C F Hemiptera of Colo , Colo. Agri Exp. Sta. Bull. 81, Tech. Ser. 1, p. 64. (Quotes Uhler.)

1900. *Corisa convexa*, Heidemann, O. Proc. Wash Acad II, p. 506. (Records Popof Isl. and Berg Bay)

1909 *Arctocorisa sutilis*, Kirkaldy, G. W , and Torre-Bueno, J R de la Catalogue *in* Proc. Ent Soc. Wash. X, p. 197

1917. *Arctocorixa sutilis*, Van Duzee, E. P Catalogue of Hemiptera . . . , p. 484.

Size: Length 7.4 mm. to 9.8 mm. Width of head across eyes 2.4 mm. to 3.1 mm.

Color: General facies medium brown. Pronotum crossed by 10 to 12 very irregular and broken dark bands about half as wide as pale interspaces. Claval pattern reticulate, the dark color dominant on distal portion. Corial pattern of short, broken lines of dark and light, arranged in longitudinal series. Membrane separated from corium by pale line; pattern reticulate and as dark as that of rest of hemelytra. Embolium, head, limbs and thoracic venter pale; abdominal venter smoky with pale margins.

Structural characteristics: Head about half as long as pronotal disk; interocular space greater than width of an eye; vertex of female rounded, that of male produced very slightly beyond eye margins; facial hairs few to moderately numerous in both sexes; male fovea moderately broad and fairly deep; antennal segmentation: 1 : 2 : 3 : 4 :: 28 : 23 : 53 : 35 ♂ ; 1 : 2 : 3 : 4 :: 30 : 26 : 57 : 35 ♀ . Pronotal disk with pronounced median carina plainly visible for almost its entire length; disk pointed or rounded apically; pronotum and hemelytra moderately rastrate, the latter with numerous pale hairs, especially on corium; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of the prothorax about two-thirds as broad at base as long, tip truncate, sides almost parallel; mesoepimeron narrow with osteole near its tip; metaxyphus about as broad at base as long, tip narrow and pointed. Front leg of female of usual shape. Front leg of male: pala long and slender with 37 to 42 pegs in a single, unbroken row; dorsal edge of pala carinate at base, curved inward just beyond basal third; tibia about half as long as pala, dorsal carina not thin, extending nearly to base, pad long and narrow; patch of bristles at apex just below pad; femur moderately slender with patch of about 10 rows of stridulatory pegs on inner surface. Middle and hind legs long and slender; middle femur somewhat spiny. Segmental proportions: Middle leg: femur : tibia : tarsus : claw :: 100 : 49.4 : 36.8 : 36.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.5 : 138.8 : 55.5. Male asymmetry dextral; strigil very large, ovoid, of about 20 to 24 irregular combs. Right clasper of genital capsule slightly bifurcate at tip as in Plate LXXXIX, figs. 3a and 3b, and as in 2a and 2b. For details of male pala and abdomen see Plate LXXXIX, figs. 3 and 3d. Female abdomen with seventh ventral segment incised at tip as in Plate LXXXIX, fig. 3c or 2c.

Comparative notes: This is our largest American *Arctocorisa,* being somewhat broader than *A. convexa* (Fieb.).

Location of types: In the Uhler collection of the U. S. National Museum there are three cotypes, 2 males and 1 female. I selected one of the males as the lectotype and have shown its structure on Plate LXXXIX, figs. 3, 3a, 3b and 3c. Because we had specimens, from various places, which were somewhat smaller with the right genital clasper lacking the subapical flap, as in figures 2b and 2c, I assumed we had a subspecies. However, I dissected the other male cotype to find that its right clasper was also like figures 2b and 2c. I conclude, therefore, that the males of this species are dimorphic in this character and find that the females also show some dimorphism as indicated on Plate LXXXIX. Since both forms have been taken at the same time and place on some occasions, it seems obvious that they are not to be distinguished as subspecies.

Data on distribution: (Plate XC.) The published records include Colorado, Montana, Utah, New Mexico and British America. We have examined the following:

CANADA: *Northwest Territories:* Great Slave Lake, Outpost Isl., Sept. 6, 1945, D. S. Rawson, 3 males, 3 females, 2 nymphs; same place and collector, Aug. 28, 1945, 1 male, 2 females.

Alberta: S. W. Alberta, Lonesome Lake, June 21, 1937, via D. S. Rawson, 4 females; same place and collector, June 12, 1938, 1 male, 2 females*; Edmonton, Aug. 7, 1915, E. H. Strickland, 1 male* (Can. Coll.); Peace River, Aug. 11, 1915, same collector, 1 male* (Can. Coll.).

Manitoba: Aweme, April 22, 1915, N. Criddle, 1 female* (Can. Coll.).

U. S. A.: *Alaska:* Kodiak, Sept. 10, 1919, Jasper S. Hine, 1 male, 3 females; Popof Island, 4 males, 6 females;* Popof Island, T. Kinkaid (Harriman Exp. 1899, U. S. N. M.), 1 female; * Berg Bay, June 10, 1899, same collector (Harriman Exp. 1899, U. S. N. M.), 1 female.*

Montana: Uhler Coll. 1 male; Anaconda, Aug. 12, 1931, L. D. Anderson, 1 male.*

Wyoming: Grand Teton Nat'l Park, Aug. 18, 1931, L. D. Anderson, 1 male, 2 females, also 1 male, 1 female; * Boulder, Aug. 19, 1931, same collector, 1 male.*

Colorado: Uhler Coll. 1 female and cotypes mentioned above; Pingree Park, Aug. 1925, Beamer and Lawson, 1 male, 3 females; also 6 males, 2 females; * Cameron's Pass, Aug. 20, 1940, L. C. Kuitert, 5 males, 4 females; * nr. Cameron's Pass, Pot Hole, alt. 10,000 ft., 3 mi. w. of divide, Aug. 20, 1940, H. C. Severin, 3 females; Gould, fish pond, 9,250 ft., Aug. 20, 1940, same collector, 5 males.

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* These are like figures 2, 2a, 2b and 2c on Plate LXXXIX.

Arctocorisa carinata (Sahlberg)

(Plate LXXXVIII, figs. 1, 1a-1d and wash drawing 50, Plate VII)

1819. *Corixa carinata* Sahlberg, Corolo R. Dissertatio Academica; Observationes Quasdam Historiam Notonectidum, Imprimis Fennicarum Illustrantes . . . Aboae p. 12. (Desc. "Ad Ylåne, Nygard.")

For some other references before 1925 see Lundblad below who omits many entries including some of his own.

1925. *Arctocorixa carinata*, Lundblad, O. Ent. Tidskrift XLVI, Haft 2, pp. 127-142, text figs. 1, [illegible] and 3, Pl. IV.

1930. *Arctocorisa carinata*, Jones, H P. Entomologists' Record, XL-XLII; reprint, p. 76.

1931. *Sigara carinata*, Lundblad, O. Zool. Anzeiger, XCVI, Haft 3-4, p. 87. (Compares type of *C. convexa* Fieber from Halle with it.)

1932. *Corixa carinata*, Lindberg, Hakan. Memoranda Societatis pro Fauna et Flora Fennica, 7, 1930-1931.

1935. *Sigara* (*Sigara*) *carinata*, Poisson, R Archives de Zool. Exp. et Gén., LXXVII, p. 548, figs. 70, 71, 72. (An Alpine species.)

1935. *Sigara* (*Sigara*) *carinata*, Stichel, W. Illustrierte Bestimmungs Tabellen der Deutschen Wanzen. Lief. 11, pp. 328-329, figs. 838-841, also Lief. 12, p. 332.

1936. *Arctocorixa carinata*, Walton, G. A. Ent. Month. Mag., Ser. 3, LXXII, p. 20.

1936. *Sigara* (*Sigara*) *carinata*, Poisson, R Bull de la Soc. Sci. de Bretagne XIII, fasc. 1 and 2, p. 9.

1936. *Sigara carinata*, Lundblad, O. Ent. Tidskrift, Hafte 1, p 61. (Ecological notes)

1938. *Sigara* (*Sigara*) *carinata*, China, W. E Ent Mo. Mag., LXXIV, p 39.

1939. *Sigara carinata*, Macon, T T. Freshwater Biol. Assoc. British Empire Scientific Publ. No. 1. Key to British Species of Corixidae, p. 12, fig. 15A, 21Q and 22R.

1942. *Corixa* (*Arctocorixa*) *carinata*, Walton, G. A. Trans. Royal Ent. Soc. London, XCII, No. 2, p. 437 (Hebrides.)

1946? *Corixa carinata*, Brown, E. S. Trans. Dumf. and Galloway Nat. Hist. and Antiquarian Soc. XXIII, p. 7.

Size: Length 7.1 mm. to 8.1 mm.* Width of head across eyes 2.2 mm. to 2.6 mm.

Color: General facies medium to dark. Pronotum crossed by 11 to 12 irregular dark bands a little wider than pale interspaces. Pattern transverse at base of clavus, reticulate and in faintly longitudinal series elsewhere. Corium and membrane separated by a pale line. Embolium silvery white, head and limbs yellow, venter dark with yellow margins.

Structural characteristics: Head about two-thirds as long as pronotal disk; interocular space greater than width of an eye; vertex of male produced beyond margins of eyes as seen from above; faces moderately hairy in both sexes; male fovea broad, fairly deep, well defined; antennal segmentation: 1 : 2 : 3 : 4 :: 24 : 18 : 48 : 38 ♂; 1 : 2 : 3 : 4 :: 25 : 20 : 50 : 38 ♀. Pronotal disk with pronounced median carina on anterior half but visible throughout; tip of disk rounded; pronotum and hemelytra coarsely rastrate, the latter thickly covered with long, pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax about three-fourths as

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* Our specimens must be small for Macon says "8 to 10 mm."

broad at base as long, sides tapering, tip truncate; mesoepimeron narrow with osteole near tip; metaxyphus long and slender. Front leg of female: pala and tibia of typical shape; femur with pilose area at base covering about one-fourth of inner surface and with an irregular row of stout spines extending from edge of pilose area almost to apical margin of femur. Front leg of male: pala with dorsal edge sharp and curving inward about one-fourth of way from base; pegs spaced wide apart in middle of row, about 38 pegs in all, carina at base on dorsal side; tibia with sharp dorsal carina and a pad; about one-half as long as pala; femur relatively stout, margins tapered, with a row of stout spines on inner surface and a patch of about 8 rows of stridulatory pegs on inner surface near base. Middle and hind legs slender; middle femur not spinose; hind femur with row of short spines on dorsal surface; comparative measurements of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 46 : 34.5 : 34.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 93.8 : 122.4 : 51. Asymmetry of male dextral; strigil of moderate size, rounded, of 8 to 10 irregular combs. Right clasper of genital capsule bifurcate at tip, the processes slender. For details of male pala, abdomen and genitalia see Plate LXXXVIII, figs. 1, 1b, 1c and 1d. Female abdomen with seventh ventral segment broadly incised. See Plate LXXXVIII, fig. 1a.

Comparative notes: See Lundblad's splendid paper of 1925 to distinguish this European species from *A. germari* (Fieber).

Location of types: Horn says the collections of C. R. Sahlberg are in the Zool. Mus. Univ., Helsingfors, Finland.

Data on distribution: See Lundblad, Poisson, etc. We have before us the following:

ICELAND: North Iceland, Sept. 16, 1940, Wm. P. Palsson, 4 males, 8 females, 3 nymphs; also Sept. 28, 1 male; Laxardal, July 11, 1941, Wm. P. Palsson, 3 males, 3 females, 2 nymphs; same, July 16, 17 males, 32 females; same, July 21, 12 males, 10 females; same, July 23, 8 males, 11 females; same, Sept. 6.

FAEROES ISLANDS: Thorshavn, April 13, 1925, 4 males, 2 females.

SCOTLAND: 2 males, 1 female.

ENGLAND: Sticks Pass 1, Lake District, Sept. 4, 1936, 1 male, 1 female.

SWEDEN: 1 male.

FINLAND: Tvärminne, Listo, July 14, 1920, Håkan Lindberg, 4 males, 2 females.

RUSSIA: Arekcangpobck Mypman ozepo, Nov. 15, 1923.

BAVARIA: Ampero See 2215 m., 2 males, 2 females.

AUSTRIA: Alps. Col. de Balme, 1 male, 3 females.

Arctocorisa convexa (Fieber)

(Plate LXXXIX, figs. 4, 4a-4d)

1851. *Corisa convexa* Fieber, F. X. Species Generis Corisa, p. 37, Tab. II, fig. 23. (Desc from Labrador.)

1900. *Corisa convexa,* Heidemann, O Proc. Wash. Acad. II, p. 506 (Records 3 ♀ ♀ Popof Isl. and Berg Bay.) These are *A. sutilis* (Uhler).

1909. *Arctocorisa convexa,* Kirkaldy, G. W., and Torre-Bueno, J. R de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 184.

1917. *Arctocorixa convexa,* Van Duzee, E. P. Catalogue of Hemiptera . . , p. 479.

1926. *Arctocorixa convexa,* Blatchley, W. S. Heteroptera of Eastern N. A., p. 1072.

1930 *Arctocorixa convexa,* Walley, G S. Can. Ent. LXII, pp. 77-79, Pl. X. (Desc. the male. Studied specimens from Quebec and Labrador.)

1930 *Arctocorixa convexa,* Walley, G. S. Can. Ent. LXII, p 281. (From Quebec. Reports five places.)

1931. *Sigara convexa,* Lundblad, O Zool. Anzeiger, XCVI, Heft 3-4, p. 87. (Examined ♀ type from Halle Mus.)

1931. *Arctocorixa convexa,* Walley, G S. Can Ent LXIII, p 238. (From stomach of arctic grayling, Churchill River, Man.)

1936. *Arctocorixa convexa,* Walley, G. S. Can Ent LXVIII, p 62 (Records Alberta and British Columbia)

1940. *Corixa (Arctocorisa) convexa,* Hutchinson, G. E Trans. Conn. Acad. Arts and Sci. XXXIII, p. 424, figs. 228-234.

1943 *Arctocorixa convexa,* McClure, H Elliott Ecol Monographs XIII, p. 14. (From Churchill area, Manitoba. Permanent pools; eggs in early June; new adults first of August)

Size: Length 9.2 mm. to 10 mm. Width of head across eyes 2.7 mm. to 2.9 mm.

Color: General facies medium to dark. Some specimens are reddish brown (Labrador); others are chocolate brown. Pronotum crossed by 12 to 13 very irregular dark bands no wider than pale spaces. Pattern of clavus and corium reticulate, the dark coloration tending to coalesce along hemelytral suture. Corium and membrane separated by pale line. Embolium, head, and limbs pale; venter black with pale borders.

Structural characteristics: Head about half as long as pronotal disk; interocular space greater than width of an eye; vertex of male prominent, roundly produced beyond eye margins as seen from above and forming a sharp ridge as seen from lateral view; male fovea broad and deep, well-defined; antennal segmentation: 1 : 2 : 3 : 4 :: 30 : 21 : 50 : 38 ♂; 1 : 2 : 3 : 4 :: 30 : 20 : 50 : 38 ♀. Pronotal disk with pronounced median carina on anterior two-thirds but visible throughout; disk pointed apically; pronotum and hemelytra moderately rastrate, the latter with numerous pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of the claval suture. Lateral lobe of the prothorax about two-thirds as broad at base as long, sides tapering, tip truncate; mesoepimeron narrow with osteole near the tip; metaxyphus as broad as long, but with sides abruptly tapering to narrow, pointed tip. Front leg of female as in other *Arctocorisa*. Front leg of male: pala with dorsal edge strongly curved just before middle, about 38 teeth in peg row, short carina at base on dorsal margin; tibia about one-half as long as pala with dorsal carina thin and sharp and with small, wedge-shaped pad; femur slender, sides nearly parallel, with patch of about 8 or 10 rows of stridulatory pegs. Middle and hind legs slender. Middle femur not spinose, hind femur with short row of short spines on dorsal surface; comparative measurements of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 50 : 34.8 : 34.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 95.6 : 132.3 : 47.3. Male asymmetry dextral, strigil moderately large, circular, of 16 to 20 very irregular combs. Right clasper of genital capsule bifurcate at tip, the processes slender and short. For details of male structures see Plate LXXXIX, figs. 4, 4a, 4b and 4d. For female abdomen see Plate LXXXIX, fig. 4c.

Comparative notes: The prominent vertex of the male is abruptly produced beyond the margin of the eyes and distinguishes this species from other American species.

Location of types: The female type is in the Zool. Museum at Halle, Germany. It has been studied by Lundblad and by me. The male described by Walley should be the allotype and is in the Canadian Collection.

Data on distribution: (Plate XC.) Published records include Labrador, Quebec, Manitoba, Alberta and British Columbia. We have before us the following:

CANADA: *Labrador:* W. Turnavik, July 6, 1940, Sam Bartlett (U. S. N. M.), 1 female; same place, fresh water lakes, July 14, 1937, Wilcox and Nutt, 1 male, 2 females; same place, July 16, 1938, D. C. Nutt, 1 female; Cape Charles, 3 males, 8 females; Red Bay, 2 males, 4 females; W. St. Modest, 1 male, 1 female; Great Whale R., James Bay, Aug. 12, 1935 (Carnegie), 1 female; Grey Goose Isld., James Bay, Sept. 12, 1919, W. E. Walton, 1 male.

Newfoundland: (via Walton) 2 males.

Quebec: Bradore Bay, July 29, 1930, W. J. Brown, 1 male, 1 female.

Manitoba: Churchill, June 9, 1936, H. E. McClure, 3 males, 4 females.

Bering Island: 1882-'83, S. Steineger (U. S. N. M.), 1 male.

Arctocorisa lawsoni n. sp.

(Plate LXXXVIII, figs 2, 2a-2d)

Size: Length 8.5 mm. to 8.9 mm. Width of head across eyes 2.6 mm. to 2.7 mm.

Color: General facies dark. Pronotum crossed by 12 to 14 narrow, dark, irregular bands, about half as wide as pale spaces. Claval pattern transverse at base, vermiculate elsewhere. Corial pattern reticulate, the dark color dominant over the pale. Corium and membrane separated by pale line. Embolium, head, limbs, and abdominal venter pale; thoracic venter smoky to black with pale margins.

Structural characteristics: Head about half as long as pronotal disk; interocular space greater than the width of an eye; vertex of male, as seen from above, only slightly produced beyond eye margins; faces moderately hairy in both sexes; male fovea broad and deep; antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 20 : 47 : 37 ♂; 1 : 2 : 3 : 4 :: 28 : 20 : 47 : 37 ♀. Pronotal disk with pronounced median carina on two-thirds its length but visible throughout; apex pointed; pronotum and hemelytra moderately rastrate, the latter with a few pale hairs; pruinose area of the embolar groove posterior to nodal furrow equal in length to that of the claval suture. Lateral lobe of the prothorax about half as broad at base as long, sides nearly parallel, tip truncate; mesoepimeron narrow with osteole near tip; metaxyphus as broad at base as long, sides abruptly tapering to sharp point. Front leg of female of usual shape. Front leg of male: pala long and slender, dorsal edge curved inward at the middle, small carina on dorsal surface near base, 40 pegs in a slightly curving row, apical ones quite long; tibia about half as long as pala, dorsal carina not extending clear to base and not thin, pad oval in shape; femur relatively slender, broader at base, sides tapering, with a patch of about 10 rows of stridulatory pegs on inner surface. Middle and hind legs long and slender. Segmental proportions: Middle leg: femur : tibia : tarsus : claw :: 100 : 48.8 : 35 : 35. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.9 : 119.1 : 66.4. Male asymmetry dextral; strigil almost square, of 11 to 12 irregular combs. Median lobe of seventh abdominal segment rather large and rounded distally. Right clasper of male genital capsule bifurcate at tip, the processes short and slender. For details of male structures see Plate LXXXVIII, figs. 2, 2b, 2c and 2d. Seventh ventral abdominal segment of female notched at tip as in Plate LXXXVIII, fig. 2a.

Comparative notes: This species, while near *A. planifrons* (Kirby), is separable not only by the characters in the key but by the less produced vertex in the males.

Location of types: Described from male holotype, allotype and 46 paratypes (24 males, 22 females) labeled "Pingree Park, Colo., Aug. 25, Beamer and Lawson." These are in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XC.)

Wyoming: Two-gwo-tee Pass, Aug. 28, 1926, G. Cady, 2 males, 1 female.

Colorado: Pingree Park, Aug., 1925, Beamer and Lawson. 27 males, 23 females; same place, Aug., 1924, Beamer, 6 males; W. Boulder Co., Lily Lake, nr. Science Lodge, June 28, 1938, Helen Rodeck, 1 female; same place, Junis Lake, nr. Science Lodge, July 2, 1940, U. N. Lanham, 1 male, 3 females; same place, Gyranlus L., nr. Science Lodge, June 26, 1940, Lutz and Lanham, 1 male, 1 female; nr. Cameron Pass, pot hole, Aug. 20, 1940, H. C. Severin (Severin), 1 male; Gould, fish pond, 9,250 ft., same place, collector and collection, 1 male.

Arctocorisa planifrons (Kirby)

(Plate LXXXVIII, figs. 4, 4a-4d)

1837. *Corixa planifrons* Kirby, Wm., *in* Fauna Boreali Americana by John Richardson, Pt. 4, p. 284 (♂ ♂).

1837. *Corixa carinata*, Kirby, Wm., *in* Fauna Boreali Americana, Pt. 4, p. 284 (♀ ♀).

1851. *Corixa planifrons*, Fieber, F. X. Species Generis Corisa, pp. 43-44 (quotes Kirby).

1851. *Corisa kirbyi* Fieber, F. X. Species Generis Corisa, p. 43.

1878. *Corixa planifrons*, Kirby, *in* C. J. S. Bethune's reprint of Kirby's species, Can. Ent. X, p. 216

1892. *Corisa planifrons,* Harrington, W. H. Ottawa Nat. VI, p. 30.

1909. *Arctocorisa planifrons*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 196.

1926. *Arctocorixa planifrons*, Blatchley, W. S. Heteroptera of Eastern North America, pp. 1068, 1073.

Size: Length 8 mm. to 8.6 mm. Width of head across eyes 2.4 mm. to 2.6 mm.

Color: General facies medium. Pronotum crossed by 9 to 10 narrow, irregular dark lines, about half as wide as pale interspaces. Pattern of clavus and corium reticulate, about equally distributed between light and dark; membrane and corium separated by a pale line. Embolium, head, and limbs pale; venter smoky with pale margins.

Structural characteristics: Head about half as long as pronotal disk; interocular space less than width of an eye; vertex of male rounded out beyond eye margins as seen from above, male fovea broad and deep; faces relatively hairy in both sexes; antennal segmentation: 1 : 2 : 3 : 4 :: 26 : 19 : 45 : 30 ♂ ; 1 : 2 : 3 : 4 :: 28 : 19 : 48 : 32 ♀ . Pronotal disk with pronounced median carina for almost its entire length; disk rounded apically; pronotum and hemelytra moderately rastrate, the latter covered with pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax about half as broad at base as long, sides tapered slightly, tip truncate; mesoepimeron narrow with osteole near the tip; metaxyphus a little longer than broad, sides tapering to narrow tip. Front leg of female as in other *Arctocorisa.* Front leg of male: pala long and narrow, dorsal edge moderately curved inward, no carina at base on dorsal edge, about 34 pegs in a single, slightly curving row; tibial carina pronounced but not thin, pad small and somewhat wedge-shaped, tibia about half as long as pala; femur slender, sides nearly parallel, with a patch of about 12 rows of stridulatory pegs on inner surface. Middle and hind legs slender, middle femur not spinose, hind femur with short row of small spines on dorsal surface; comparative measurements of segments: Middle leg: femur : tibia : tarsus : claw :: 100 : 49.6 : 36.4 : 41.4. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 98.6 : 129.9 : 55.4. Male asymmetry dextral, strigil small, oval, of 8 irregular combs. Right clasper of genital capsule bifurcate at tip, the processes short and slender. For further details of male structures see Plate LXXXVIII, figs. 4, 4b, 4c and 4d. Seventh ventral segment of female abdomen incised at tip as in Plate LXXXVIII, fig. 4a.

Comparative notes: This is the only American species of *Arctocorisa s. str.* wherein the claw of the middle leg is plainly longer than the tarsus.

Location of types: Unknown. Mr. China says it is not in the British Museum. Kirby's types were taken by Richardson's survey party at latitude 65° and probably in the neighborhood of Great Bear Lake.

Kirby, who wrote the report concerning the insects taken on the Northern Land Expeditions under the command of Captain Sir John Franklin, lists *Corixa striata, Corixa carinata* and *Corixa plani-*

frons. These all seem to have been taken in "Latitude 65°." His description of *Corixa striata* is unrecognizable but under it he describes Variety B: "There were seven specimens distinguished by a black annulet surrounding the terminal half of the first dilated joint of the tarsus in question" (posterior tarsus). This is undoubtedly *Callicorixa alaskensis* Hungerford. Then he describes two specimens under the name *Corixa carinata* which he proposes as a new species, not knowing that a corixid was named *C. carinata* by Sahlberg in 1819. Fieber in 1851 renames this as *Corixa kirbyi*. However, Kirby then describes two other specimens "taken with the preceding" under the name *Corixa planifrons* which is four lines long (same as his *C. carinata*) and admits "they may perhaps be sexual varieties." Without doubt they are males of the two he named *Corixa carinata*. We have two males and three females from Great Slave Lake. The females would fit *Corixa carinata* Kirby and the males, *Corixa planifrons* Kirby. We therefore are convinced that since *Corixa carinata* was a preoccupied name, the species should be called *Corixa planifrons* Kirby and *Corixa kirbyi* Fieber 1851 becomes a synonym. Since the Kirby types are lost, we are selecting a male from Great Slave Lake as a neotype.

Data on distribution: (Plate XC.)

CANADA: *Newfoundland:* Ferryland, Aug. 2, 1934, S. T. Brooks (Carnegie), 1 male, 3 females.

Labrador: Grand Caribou Isld., Battle Harbor, July 16, 1927, A. C. Weed, 3 males, 4 females, Rawson-MacMillan Exp. (Chicago-Field Mus. Coll.).

Northwest Territories: Great Slave Lake, Outpost Isl., Aug. 28, 1945, D. S. Rawson, 2 males, 2 females; same place and collector, Aug. 1, 1945, 1 female.

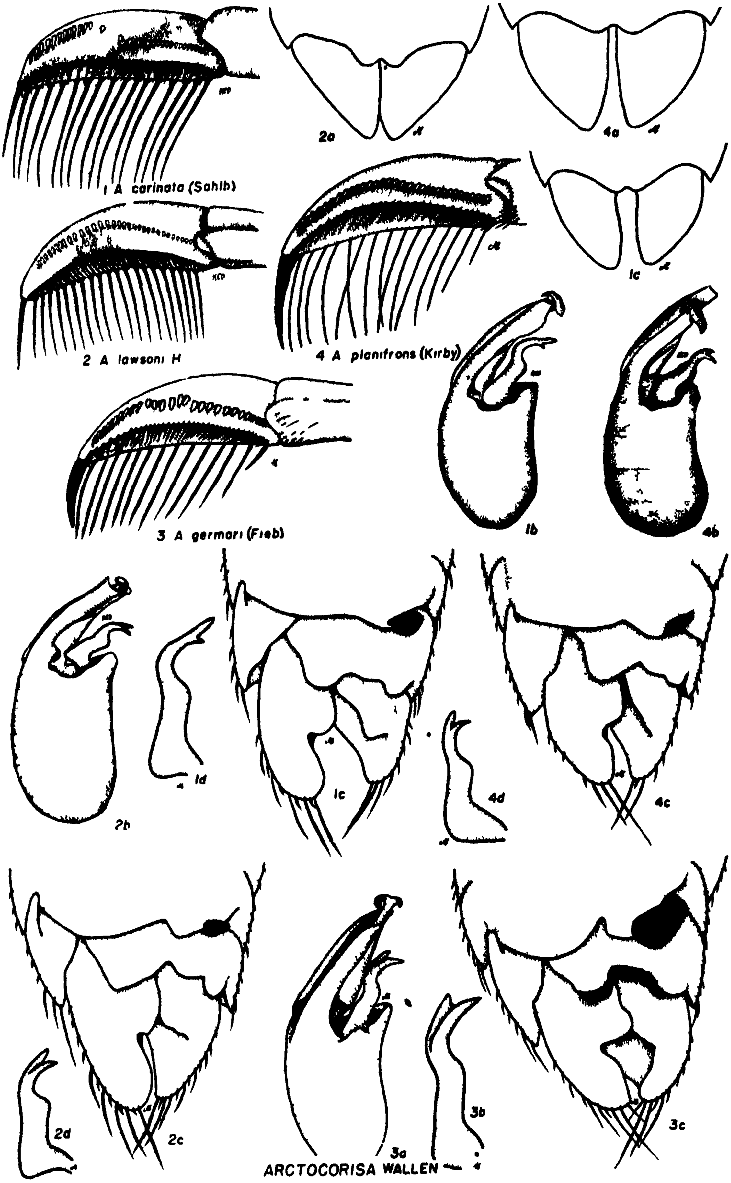
ALASKA: Fort Yukon, May 24, 1912, J. M. Jessup, 1 male, 1 female; nr. Mt. Pavlof, Sept. 9, 1913 (F. C. Van Dyke. donor), 3 males, 1 female; Agattu Island, May 12, 1937, V. B. Scheffer (L. W. Saylor Biol. Survey, Wash., D. C.), 1 female; Unalaska, Aug. 26, 1937, V. B. Scheffer (L. W. Saylor Biol. Survey, Washington, D. C.), 1 female; Nome, Aug. 21, 1913 (F. C. Van Dyke, donor), 1 male; Sanak Island, Aug. 28, 1937, V. B. Scheffer (L. W. Saylor Biol. Surv., Wash., D. C.), 1 female; East Unalga Island, Aug. 28, 1937, V. B. Scheffer (L. W. Saylor Biol. Surv., Washington, D. C.), 13 males, 38 females and 12 nymphs.

PLATE LXXXVIII

Arctocorisa Wallengren

FIG. 1. *Arctocorisa carinata* (Sahlberg); pala of male.
FIG. 1a. Ventral view of 7th abdominal segment of female.
FIG. 1b. Genital capsule of male.
FIG. 1c. Dorsal view of male abdomen.
FIG. 1d. Right clasper, enlarged.
FIG. 2. *Arctocorisa lawsoni* n. sp.; pala of male.
FIG. 2a. Ventral view of 7th abdominal segment of female.
FIG. 2b. Genital capsule of male.
FIG. 2c. Dorsal view of male abdomen.
FIG. 2d. Right clasper of male, enlarged.
FIG. 3. *Arctocorisa germari* (Fieber); pala of male.
FIG. 3a. Genital capsule of male.
FIG. 3b. Right clasper, enlarged.
FIG. 3c. Dorsal view of male abdomen.
FIG. 4 *Arctocorisa planifrons* (Kirby); pala of male.
FIG. 4a. Ventral view of 7th abdominal segment of female
FIG. 4b. Genital capsule of male.
FIG. 4c. Dorsal view of male abdomen.
FIG. 4d. Right clasper of male, enlarged.

PLATE LXXXVIII



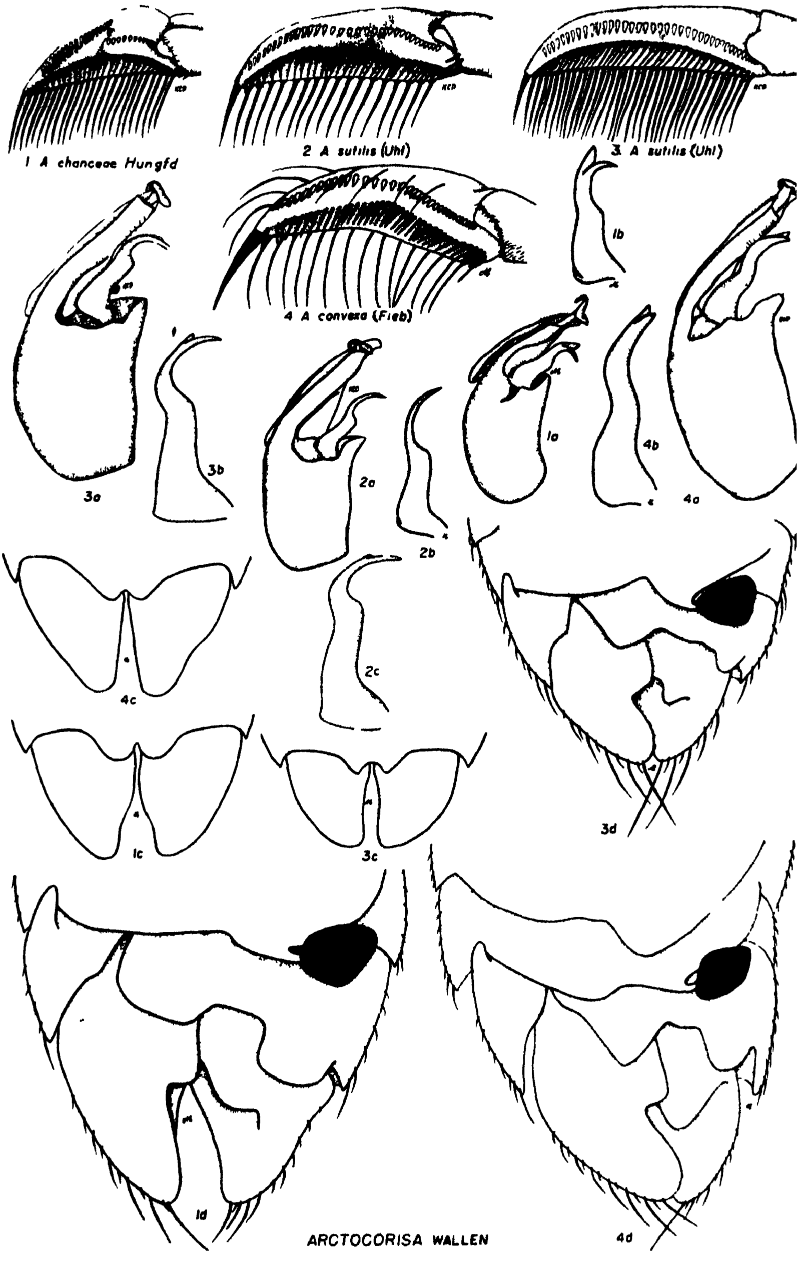
ARCTOCORISA WALLEN

PLATE LXXXIX

Arctocorisa Wallengren

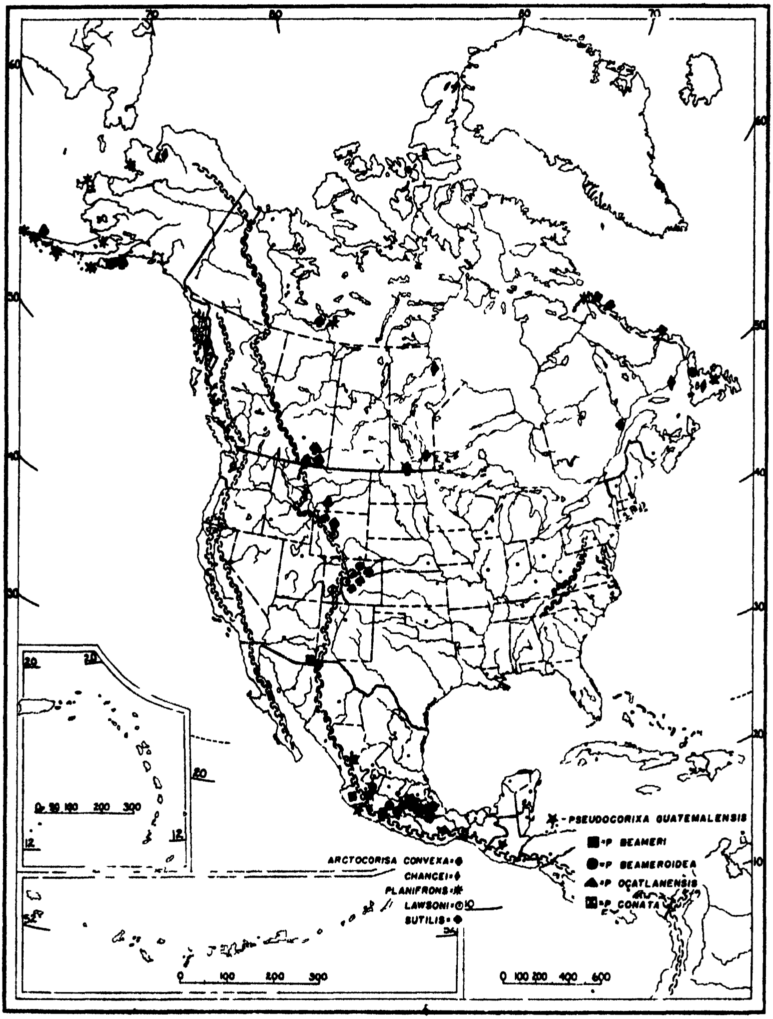
FIG. 1. *Arctocorisa chanceæ* Hungerford; pala of male.
FIG. 1a. Genital capsule of male.
FIG. 1b. Right clasper of male, enlarged.
FIG. 1c. Ventral view of 7th abdominal segment of female.
FIG. 1d. Dorsal view of male abdomen.
FIG. 2. *Arctocorisa sutilis* (Uhler); showing variation; pala of male
FIG. 2a. Genital capsule of male.
FIG. 2b. Right clasper of cotype, enlarged.
FIG. 2c. Right clasper, Pingree Park, Colo.
FIG. 2d. Ventral view of 7th abdominal segment of female
FIG. 2e. Dorsal view of male abdomen.
FIG. 3. *Arctocorisa sutilis* (Uhler); pala of male.
FIG. 3a. Genital capsule of male (lectotype).
FIG. 3b. Right clasper of male (like lectotype, Pingree Park, Colo.).
FIG. 3c. Ventral view of 7th abdominal segment of female.
FIG. 3d. Dorsal view of male abdomen.
FIG. 4. *Arctocorisa convexa* (Fieber); pala of male.
FIG. 4a. Genital capsule of male.
FIG. 4b. Right clasper, enlarged.
FIG. 4c. Ventral view of 7th abdominal segment of female
FIG. 4d. Dorsal view of male abdomen.

PLATE LXXXIX



ARCTOCORISA WALLEN

PLATE XC


★ - PSEUDOCORIXA GUATEMALENSIS
■ = P BEAMERI
● = P BEAMEROIDEA
▲ = P OCATLANENSIS
▣ = P CONATA
ARCTOCORISA CONVEXA = ◆
CHANCEI = ♦
PLANIFRONS = ✱
LAWSONI = ⊙
SUTILIS = ●
0 100 200 400 600
0 100 200 300
0 50 100 200 300
70
80
80
70
60
50
40
30
20
10
20
12
12

The Genus *Sigara* Fabricius 1775

1775. Fabricius, J. C. Syst. Ent., p. 691.

1804. Latreille, P. A. *in* Sonnini's Buffon, Ins. XII, p. 289.

1924. Schumacher, F. Deutsch. Ent. Zeitschr., pp. 337-339 (says *Corixa* Geoffr. is synonym).

1927. Jaczewski, T. Ann. Zool. Mus. Pol. Hist. Nat., T. VI, zesz. 3, pp. 251-261 (as genus, *sens. lat.*).

1928. Jaczewski, T. Ann. Mus. Zool. Pol. VII, pp. 45-67 (as genus, *sens. lat.;* wide distribution).

1928 Lundblad, O. Sårtryck ur Ent. Tidskr., XLVIII, Häft 4, pp. 228-241 (as genus, *sens. lat.*).

1929. Hutchinson, G. E. Annals of the South African Mus, XXV, Pt. 3, p. 448 (description; *sens. lat.*).

1929. Lundblad, O. Zoologischer Anzeiger, Bd. 80, Heft 7/9, pp. 193-204 (*sens lat.*).

1930. Hutchinson, G. E. Proc Zool. Soc. London, XXIX, Pt. 2, p. 461 (*sens. lat.*).

1930. Jones, H. P. Ent. Record, XL-XLII; reprint, p. 72 (= *Arctocorisa* Wallengr., Oshanin Cat.; = *Corixa* Br. Cat.).

1930. Walley, G. S. Bull. Brookl. Ent. Soc., XXV, p. 49 (*Corixa* Geoffroy = *Sigara* Fabr.)

1935. De Carlo, José A. Revista Chilena de Hist Nat, XXXIX, p. 108 (= *Arctocorisa* Wallengr., = *Callicorixa* B. White; and adds in footnote that it has for some time been confused with *Corixa* Geoffroy).

1935. Poisson, R. Archives de Zool. Exp. et Gén., LXXVII, p. 457 (= *Arctocorisa* Wallengr.; = *Callicorixa* B. White); p. 504 (as subg.—*Sigara sens. str*).

1936. Lindberg, Håkan. Die Tierwelt der Nord und Ostsee, Lieferung 30, Tiel XI, pp 114-115 (genus, *sens. lat.*).

1936. Poisson, R. Ext. du Bull. de la Soc. Sci. Bretagne, Tome XIII, Fasc. 1 and 2, p. 6 (subgenus *Sigara s s.*).

1937. Wagner, Eduard. Verhandl. des Ver f naturw Heimatforschung zu Hamburg, Bd. 25, pp 61-62 (*sens lat.*).

1938. China, W. E. Ent. Mo. Mag., LXXIV, pp. 34-37 (*Sigara* F. not a synonym of *Corixa* Geoffr.) (= *Arctocorisa* Wallengr.).

1939. Macan, T. T. Freshwater Biol. Asso British Empire, Sci. Publ. I, pp. 7-17 (key, *sens. lat.*).

1939. Pearce, E. J., and Walton, G. A. Trans. Soc. for British Entomology, VI, Pt. 7, pp. 160-161 (genus, *sens. str.*).

1940. Walton, G. A. Trans. Conn. Acad. Arts and Sci., XXXIII, p. 345 (as subg. of *Corixa* Geoffr.).

1940. Hutchinson, G. E. Trans. Conn Acad. Arts and Sci, XXXIII, pp. 341-343 (as subg. of *Corixa* Geoffr.).

1942. Walton, G. A. Trans. Roy. Ent. Soc. London, 92 (2), pp. 441-442 (subg. of *Corixa* Geoffr.).

1943. Walton, G. A. Trans. Soc. for British Ent., Vol. 8, Pt. 5, pp. 158-162, 163, 165, 167 (as subgenus of *Corixa* Geoffr.; also, p. 165, as synonym of *Corixa* Geoffr.).

1943. China, W. E. Ent. Mo. Mag., LXXIX, pp. 109-111 (not congeneric with *Corixa* Geoffr.).

1943. China, W. E. The Generic Names of British Insects. Part 8, the Generic Names of the British Hemiptera-Heteroptera, pp. 282, 305 (as subgenus of *Corixa* Geoffr.).

The genus *Sigara* Fabricius is an extremely variable one, occurring all over the world, and is composed of a number of subgenera containing a great many species. Of these subgenera, *Arctosigara* new subg. [containing *conocephala, penniensis,* and *decoratella* (Hungerford) and *bicoloripennis* (Walley)] is probably the most primitive, in the sense of being the least variable, while those species belonging to the subgenus *Tropocorixa* Hutchinson show the greatest variation. In the Western Hemisphere, the subgenus *Tropocorixa* occurs in South America, while most of the North American species of *Sigara* fall into *Vermicorixa* Walton. There are no representatives in the Americas of *Halicorixa* Walton or of *Retrocorixa* Walton.

Because of the extreme variation from one subgenus to another, it is difficult to characterize this genus. However, the various species have the following characters in common:

Lateral lobes of the prothorax elongate, linguiform [except *S. ornata* (Abbott)]; anterior tibiae with a few small apical spines, those of males carinate dorsally, often with an apical pad; metaxyphus rather small, usually triangular or arrow-shaped. Venter of hind femur pubescent on at least the basal third, often more, the glabrous portion with scattered spines; upper surface with from 2 or 3 spines to 2 or 3 longitudinal rows of spines.

Genotype: *Notonecta striata* Linné.

KEY TO *SIGARA* OF THE WESTERN HEMISPHERE

1. South American species with pattern of hemelytra mottled, broken into many fragments; male right clasper of bizarre shapes... *S. Tropocorixa* Hutchinson (See key, p. 764)
Not as above 2
2. (1) Length of insects more than 6.3 mm. long 3
Length of insects less than 6.3 mm. long 10
3. (2) Palae of both sexes with only 14 to 16 lower palmar hairs. *Sigara (Arctosigara) decoratella* (Hungfd.) (p. 616)
Palae of both sexes with from 18 to 22 lower palmar hairs 4
4 (3) Mesoepimeron at the level of the scent gland osteole broader than the lateral prothoracic lobe, with the osteole remote from the tip of the mesoepimeron . 5
Mesoepimeron narrow; osteole near tip 6
5 (4) Postnodal pruinose area nearly 2½ times as long as the claval pruinose area; meron longer than the claval pruinose area; anal lobes of female deeply incised ventrally along inner margin..... *Sigara (Xenosigara) ornata* (Abbott) (p. 681)
Postnodal pruinose area less than twice as long as the claval pruinose area; meron equal in length to the claval pruinose area; female anal lobes normal. *Sigara (Pediosigara) depressa* n. sp. (p. 640)
6. (4) Metaxyphus broad, nearly quadrate; claw of pala serrate at base in both sexes. *Sigara (Allosigara) decorata* (Abbott) (p. 629)
Metaxyphus normal; palar claw normal 7
7. (6) Postnodal pruinose area longer than the pruinose area along the claval suture.. 8
Postnodal pruinose area and claval pruinose area of equal length. *Sigara (Vermicorixa) alternata* (Say) (p. 658)
8. (7) Interocular space plainly narrower than an eye; male pala with peg row near palm .... *Sigara (Arctosigara) penniensis* (Hungfd.) (p. 620)
Interocular space practically equal to the width of an eye; male pala not as above 9

9. (8) Metaxyphus not appearing inflated, the tip not bent dorsad between the hind coxae; male pala long and slender; male vertex conically produced.
Sigara (*Arctosigara*) *conocephala* (Hungfd.)
(p. 614)

Metaxyphus inflated, the tip bent dorsad between hind coxae; male pala a thin, broad plate; male vertex only slightly produced.
Sigara (*Subsigara*) *fallenoidea* (Hungfd.)
(p. 643)

10. (2) Pronotal disk with median longitudinal pale line 11

Pronotal disk without a median longitudinal pale line 18

11. (10) Species with the mesal margin of the mesoepimeron extending beyond the disto-lateral angle of the mesosternum for a distance equal to or greater than the distance between the tip of the mesoepimeron and the scent gland osteole.... 12

Species with the mesal margin of the mesoepimeron extending beyond the disto-lateral angle of the mesosternum for a distance shorter than the distance between the tip of the mesoepimeron and the scent gland osteole............. 14

12. (11) Hemelytra nearly black with obscure longitudinal pale markings; dorsal edge of male pala thickened, with a prominent keel on the outside.
Sigara (*Phaeosigara*) *variabilis* (Hungfd.)
(p. 783)

Hemelytra and male pala not as above. 13

13. (12) Male pala with a single row of pegs, female abdomen with anal lobes not notched on inner ventral margin.. . . ..*Sigara* (*Vermicorixa*) *johnstoni* n. sp
(p. 698)

Male pala with two rows of pegs; female abdomen with anal lobes notched on inner ventral margin. ....*Sigara* (*Vermicorixa*) *knighti* n. sp.
(p. 695)

14. (11) The mesal margin of the mesoepimeron extending beyond the disto-lateral angle angle of the mesosternum for a distance equal to only one-third the distance between the tip of the mesoepimeron and the scent gland osteole.
Sigara (*Pediosigara*) *depressa* n. sp
(p. 640)

The mesal margin of the mesoepimeron extending beyond the disto-lateral angle of the mesosternum for a distance equal to at least one-half the distance between tip of mesoepimeron and the scent gland osteole.. 15

15. (14) Pronotum and hemelytra (including membrane) boldly cross-barred*; vertex in both sexes conically produced beyond eye-curve
Sigara (*Vermicorixa*) *transfigurata* (Walley)
(p. 689)

Pattern less striking; vertex not noticeably produced....... 16

16. (15) Moderately rastrate, pale figures on distal half of clavus and on corium arranged longitudinally in more or less connected series, pattern of membrane distinct 17

Strongly rastrate; pale figures on distal half of clavus and usually those on corium transverse; pattern of membrane indistinct or effaced; male strigil small and round . . . .*Sigara* (*Phaeosigara*) *compressoidea* (Hungfd.)
(p. 735)

17. (16) Male with elongate strigil; right clasper of male genital capsule strongly constricted ....*Sigara* (*Phaeosigara*) *mackinacensis* (Hungfd.)
(p. 740)

Male with rounded strigil; right clasper of male genital capsule not constricted .... *Sigara* (*Phaeosigara*) *mississippiensis* (Hungfd.)
(p. 742)

18. (10) Corial pattern in definite longitudinal series or solid black.... 19

Corial pattern not in definite longitudinal series.......................... 23

19. (18) Claval and corial fields solid black; pronotum black, crossed by three or four pale lines........ ....*Sigara* (*Pediosigara*) *hydatotrephes* (Kirk.)
(p. 638)

Not as above 20

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* *Transfigurata* is typically with four black bands on the pronotal disk, and hemelytra cross-banded, but sometimes the pronotum, clavus, corium, and membrane are solid black, except for the pale median line on the pronotum.

20. (19) Clavus with pale lines in wavy longitudinal series; hypo-ocular suture ending laterad of the middle line of the eyes
Sigara (Pileosigara) douglasensis (Hungfd.)
(p. 684)
Not as above 21

21. (20) Antennae usually 3-segmented; small species, less than 4.25 mm. long.
Sigara (Lasiosigara) lineata (Forster)
(p. 645)
Antennae 4-segmented; larger species, more than 4.25 mm. long.............. 22

22. (21) Scent gland osteole far laterad, remote from tip of mesoepimeron; male pala with a single row of pegs.............*Sigara (Lasiosigara) trilineata* (Prov.)
(p. 649)
Scent gland osteole near end of mesoepimeron; male pala with two rows of pegs ....*Sigara (Vermicorixa) mullettensis* (Hungfd.)
(p. 691)

23. (18) Metaxyphus longer than broad.. 24
Metaxyphus not longer than broad.................................... 28

24. (23) Mesoepimeron at level of the scent gland osteole about equal in width to the lateral lobe of the prothorax.. 25
Mesoepimeron at level of the scent gland osteole much broader than the width of the lateral lobe of the prothorax...................................... 27

25. (24) Pronotum longer than the head as seen from above........................ 26
Pronotum shorter than the head as seen from above; crossed by only 3 or 4 pale lines.................*Sigara (Phaeosigara) macrocepsoidea* Hungfd
(p. 751)

26. (25) Male with stridular area on front femur; female pala depressed dorsally near apex ....*Sigara (Phaeosigara) dolabra* H. & S
(p. 752)
Male without a stridular area on front femur; female pala not depressed.
Sigara (Aphelosigara) jarmanae Hungfd
(p. 696)

27. (24) Pale bands on base of clavus entire, bands on corium plainly transverse; female pala normal; dorsal surface of hind femur with only 3 or 4 pegs.
Sigara (Vermicorixa) solensis (Hungfd.)
(p. 686)
Pale bands on base of clavus more or less broken and confused, sometimes in faintly longitudinal series; female pala depressed dorsally near apex; dorsal surface of hind femur with two or three rows of pegs.
Sigara (Phaeosigara) signata (Fieber)
(= *serrata* Abbott) (p. 745)

28. (23) With the scent gland osteole nearer the lateral bend of the mesoepimeron than to its tip 29
With the scent gland osteole nearer to tip than to lateral bend of the mesoepimeron 32

29. (28) Male peg row of about 22 pegs midway between dorsal margin and palm; female pala slightly depressed dorsally..*Sigara (Vermicorixa) gordita* (Abbott)
(p. 712)
Male peg row of 30 or more pegs, nearer to dorsal margin; female pala not depressed 30

30. (29) Head with median longitudinal brown line; pruinose area long claval suture much shorter than the postnodal pruinose area; mesoepimeron with a deep incision at or near the lateral bend; male strigil large.
Sigara (Vermicorixa) mathesoni n. sp.
(p. 683)
Not as above 31

31. (30) Osteole almost in lateral bend of mesoepimeron, and connected to the metasternum by the broad, often dark postcoxal piece (lateral flange of the sternellum) ....*Sigara (Vermicorixa) grossolineata* n. sp.
(p. 676)
Osteole not so far laterad........... *Sigara (Vermicorixa) stigmatica* (Fieb.)
(p. 665)
Sigara (Vermicorixa) modesta (Abbott)
(p. 666)

32. (28) Claval lineations more or less entire or slightly forked 33
Not as above, broken into many fragments 45

33. (32) Corial pattern in more or less definite longitudinal series 34
Corial pattern not as above 35

34. (33) Pronotal disk laterally reduced; only 4 to 6 pegs on dorsal surface of hind femur .... *Sigara* (*Vermicorixa*) *hubbelli* (Hungfd.) (p. 696)
Pronotal disk not laterally reduced; a row of at least a dozen pegs on dorsal surface of hind femur .... *Sigara* (*Vermicorixa*) *defecta* n. sp. (p. 699)

35. (33) Metaxyphus short, plainly broader than long 36
Metaxyphus about as broad as long 44

36. (35) Metaxyphus tip a right angle ...... *Sigara* (*Arctosigara*) *bicoloripennis* (Walley) (p. 623)
Metaxyphus with sides forming less than a right angle 37

37 (36) Antero-lateral margin of clavus ridged and projecting laterally over the pruinose area along the claval suture .... *Sigara* (*Vermicorixa*) *vandykei* n. sp (p. 685)
Not as above 38

38. (37) Male pala with its row of pegs nearer the dorsal margin than the palm 39
Male pala with its row of pegs nearer to palm than to dorsal margin, and with a dorsal hump .... *Sigara* (*Vermicorixa*) *pectenata* (Abbott) (p. 705)

39 (38) Male pala with from 20 to 26 pegs 40
Male pala with more than 30 pegs 41

40 (39) Male pala as in text figure 17, p. 711; pronotal disk laterally reduced and heart-shaped .... *Sigara* (*Vermicorixa*) *scabra* (Abbott) (p. 709)
Male pala as on Plate CII; pronotal disk not laterally reduced nor heart-shaped .... *Sigara* (*Phaeosigara*) *macropala* (Hungfd.) (p. 743)

41 (39) Mesoepimeron broader at the lateral bend than at the level of the scent gland osteole; osteole on a level with the disto-lateral angle of the mesosternum . 42
Mesoepimeron of equal width from osteole to the lateral bend; osteole posterior to the disto-lateral angle of the mesosternum.
Sigara (*Vermicorixa*) *alternata* (Say) (p 653)

42. (41) Lateral margin of pronotal disk rounded; male strigil elongate, of about 6 combs .... *Sigara* (*Vermicorixa*) *virginiensis* n. sp. (p. 671)
Lateral margin of pronotal disk angulate, male strigil more rounded, of about 4 combs 43

43. (42) Right clasper of male genital capsule as on Plate XCIII, fig. 1b; pronotal disk of female more than half as long as broad.
Sigara (*Vermicorixa*) *mckinstryi* n. sp. (p. 681)
Right clasper of male as on Plate XCIII, fig. 4b, pronotal disk of female less than half as long as broad ...... *Sigara* (*Vermicorixa*)' *washingtonensis* n. sp. (p. 678)

44. (35) Male pala broadest near its base, an oblique ridge across palar face; lateral margin of disk acute .... *Sigara* (*Vermicorixa*) *nevadensis* (Walley). (p. 704)
Male pala broadest beyond middle, no ridge across palar face; lateral margin of pronotal disk rounded .... *Sigara* (*Vermicorixa*) *omani* (Hungfd.) (p. 701)

45. (32) Metaxyphus about as long as broad 46
Metaxyphus broader than long 47

46. (45) Male pala broadest across basal third ...... *Sigara* (*Vermicorixa*) *cubiensis* n. sp. (p. 708)
Male pala not as above .... *Sigara* (*Phaeosigara*) *quebecensis* (Walley) (p. 738)

47. (45) Postocular space rather broad; interocular space almost equal to the width of an eye; right clasper of male having a sheath on distal portion (see Plate CIII) .... *Sigara (Phaeosigara) paludata* Hungfd. (p. 749)

Postocular space not broad; interocular space much narrower than the width of an eye; tip of right clasper of male without a sheath.................... 48

48. (47) Less than 4 mm. long; right margin of 7th abdominal segment of male without a lateral projection; pala of female not depressed. *Sigara (Phaeosigara) bradleyi* (Abbott) (p. 725)

More than 4 mm. long; right margin of 7th abdominal segment of male with a lateral projection; pala of female depressed dorsally near apex............ 49

49. (48) Hind femur pubescent ventrally for only slightly more than half its length and with a row of short spines on dorsal surface; male structures as on Plate CI; 4.1 mm. to 4.5 mm. long. .. .*Sigara (Phaeosigara) sigmoidea* (Abbott) (p. 728)

Hind femur pubescent ventrally for two-thirds its length and with only two or three spines or none on dorsal surface; male structures as on Plate CI; 4.5 mm. to 5 mm. long. ...... *Sigara (Phaeosigara) zimmermanni* (Fieb.) (= *compressa* Abbott) (p. 730)

Subgenus *Arctosigara* new

Species having elongate or pointed pala and the lateral lobe of the prothorax elongate with the posterior distal angle slightly produced. Subgenotype *S. conocephala* (Hungerford).

Sigara (*Arctosigara*) *conocephala* (Hungerford)

(Plate XCI, figs. 1, 1a, 1b)

1926. *Arctocorixa conocephala* Hungerford, H. B. Can. Ent. LVIII, p. 270, Pl. figs. 1 and 2.

1946. *Arctocorixa conocephala*, Proctor, Wm. Biol. Surv. of Mt. Desert Region, Inc., Pt. VII, The Insect Fauna, p. 82 (Maine).

Size: Length 7.4 mm. to 8.8 mm. Width across eyes 2.1 mm. to 2.6 mm.

Color: General facies medium to dark. Pronotum crossed by 7 to 9 dark bands, some of them incomplete or broken; apical ones joined at ends by a dark band along distal margin of pronotal disk. Clavus boldly cross-barred; in some specimens the dark color tends to coalesce along the hemelytral suture. Pale areas of corium in transverse series, but the dark tending to coalesce on outer and inner margins into longitudinal series. Membrane separated from corium by a pale and a dark line side by side; pattern reticulate. Head, limbs, embolium, and venter pale; basal segments of abdomen sometimes dark with pale margins.

Structural characteristics: Head of male more than two-thirds as long as the disk of pronotum and that of female about one-half as long as disk of pronotum. The vertex of the male triangularly produced beyond the margin of the eyes as seen from above, that of female rounded. Interocular space of female broader than that of male. Male fovea deep and long, its upper end overhung medianly by a projection of the vertex. Face not hairy. The male fovea with a longitudinal strip of short pile. Antennal segmentation: 1 : 2 : 3 : 4 :: 30 : 20 : 45 : 30 ♂ ; 1 : 2 : 3 : 4 :: 32 : 22 : 50 : 32 ♀. Pronotal disk with median carina on anterior fourth; disk with lateral margins angulate, distal margin curved; pronotum and hemelytra heavily rastrate, the latter with long pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax elongate, sides parallel, posterior distal angle slightly produced. Mesoepimeron moderately broad, the osteole a third of the distance from tip to lateral bend. Metaxyphus triangular, as broad as long, apex blunt. Front leg of female of usual shape except that the pala is quite long in proportion to its width (width twenty-eight percent of length). Front leg of male: pala elongate, almost four times as long as broad, peg row of about 37 or 38 pegs lying near the dorsal margin with the apical 4 or 5 pegs spaced widely apart, the outside of pala with a low longitudinal nearly median ridge; the tibia less than half as long as the pala with a short dorsal carina; femur with ventral margin somewhat swollen on basal four-fifths and a pilose area on inner base; the trochanter with a spine-tipped tumescence. Middle and hind legs relatively long and slender; hind femur with row of short spines on ventral surface midway between margins, beyond the middle. Segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 43.8 : 33.8 : 43.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 74.4 : 128.8 : 33.3. Male asymmetry dextral; strigil small, transverse, of 6 regular combs. Median lobe of seventh abdominal segment small and triangular; anal lobes long. For details of male structures see Plate XCI, figs. 1, 1a, 1b. Female abdomen normal.

Comparative notes: The unusually long pala in both sexes and the strikingly produced vertex of the male readily marks this species.

Location of types: Holotype male, "Mackinac Island State Park, Mich., Aug. 19, 1925, H. B. Hungerford." Allotype female was not designated originally and therefore I have chosen an allotype from "St. Paul, Minn., June 29, 1931," sent by A. A. Granovsky, with which are associated several males. Three of the paratypes are from Olivia, Minn. Two from the Uhler Collection of U. S. National Museum came from Minnesota and Great Bear Lake. The holotype, allotype and some paratypes are in the Francis Huntington Snow Collections, University of Kansas; others in the Canadian

National Collection, Ottawa, Canada, the U. S. National Museum, and the University of Minnesota Collection.

Data on distribution: (Plate XCII.)

CANADA: *Alberta:* Tofield, Nov. 1, 1924, Owen Bryant, 1 female; Athabaska R., 2 miles above Pelican R., F. Harper.

Saskatchewan: Helen Lake, June 15, 1939, J. E. Moore, 1 female; Margo Lake, July 10, 1938, D. S. Rawson, 1 male, 2 females; Murray Lake, 1940, same collector, 1 male; Hudson Bay Jct., Aug. 12, 1937, D. G. Denning, 1 male; Prince Albert Nat. Park, Sept. 13, 1940, J. C. Stevenson, 6 males, 9 females.

Manitoba: J. B. Wallis, 1 male, 1 female.

U. S. A.: *North Dakota:* Lake Metagoshe, July 30, 1937, Johnston and Peters, 7 males, 3 females; Turtle Mts., Aug. 3, 1920, R. F. Hussey (Hussey Coll.), 8 males, 15 females; Stump Lake, July 7, 1902, C. K. Sibley, 1 male; Ramsey Co., Aug. 21, 1922, T. L. Hankinson (Mich. Coll.), 1 male, 1 female; Sanborn, Aug. 27, 1917, 1 female.

South Dakota: Redfield, July 20, 1937, C. L. Johnston, 1 male; Waubay, Refuge, June 4, 1942, H. C. Severin (S. Dak.), 7 males.

Minnesota: Olivia, June 28, 1921, H. H. Knight, 3 males (at light); (Uhler Coll.), 1 male, 1 female; Minneapolis, Oct. 11, 1919, R. F. Hussey (Hussey Coll.), 1 male; Cooley, Aug. 13, 1937, C. L. Johnston, 1 female; St. Paul, June 29, 1931, A. A. Granovsky, 2 males, 5 females; same place and collector, July 4, 1933, 1 female; same place and collector, July, 1934, 1 male, 1 female (last 3 entries in Minn. Coll.).

Michigan: Mackinac Island, Aug. 19, 1925, H. B. Hungerford, 1 male.

Sigara (Arctosigara) decoratella (Hungerford)

(Plate XCI, figs. 2, 2a-2b)

1926 *Arctocorixa decoratella* Hungerford, H. B. Bull. Brooklyn Ent. Soc, XXI, p. 195, Pl. XIII, figs. 8 and 14 (desc. from Mackinac Island, Mich.).

1930 *Arctocorixa decoratella,* Walley, G. S. Can. Ent. LXII, No. 4, p. 77 (records Quebec, Ontario, Manitoba, Alberta).

1930 *Arctocorixa decoratella,* Walley, G. S. Can. Ent. LXII, p. 280.

1936. *Arctocorixa decoratella,* Walley, G. S. Can. Ent. LXVIII, p. 60 (records E. Quebec to British Columbia).

1946. *Arctocorixa decoratella,* Proctor, Wm. Biol. Surv. Mt. Desert Region, Inc., Pt. VII, The Insect Fauna, p. 82 (Maine).

Also referring to this species:

1851. *Corisa limitata* Fieber, F. X. Species Generis Corisa, p. 35 (2 specimens in Halle from Pennsylvania).

1914. *Corixa alternata,* Parshley, H. M. Psyche, XXI, No. 3, p. 140. (Part of series from Orono, Me., are *decoratella.*)

Size: Length 7.1 mm. to 8.1 mm. Width across eyes 2.1 mm. to 2.6 mm.

Color: General facies medium to dark brown. Pronotum crossed by 7 to 9 dark bands; posterior 3 or 4 tending to coalesce laterally with a brown marginal line. Clavus and corium cross-banded, the pale figures, especially on corium, slender, wavy, transverse lines. Corium separated by pale line from membrane which has reticulate pattern. Embolium usually pale, sometimes smoky; head pale, limbs pale except distal fourth of middle tarsus and second tarsal segment of hind leg typically embrowned; thorax around legs black, basal segments of abdomen black, margins pale. Anal lobes of female typically brown or black.

Structural characteristics: Head about half as long as pronotal disk; interocular space equal to or greater than the width of an eye; vertex slightly produced in both sexes; face rather hairy; male fovea oval, broad, but shallow; female face slightly flattened; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 20 : 22 : 50 : 28 ♂; 1 : 2 : 3 : 4 :: 20 : 25 : 50 : 30 ♀. Pronotal disk rounded laterally, somewhat pointed distally, with faint median carina on anterior fourth; pronotum and hemelytra heavily rastrate, the latter with scattered hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax elongate, sides parallel, posterior distal angle slightly produced; mesoepimeron moderately broad but with osteole nearer to tip than to lateral bend; metaxyphus arrow-shaped, usually as broad as long. The front leg of female of usual shape but pala elongate, more than three times as long as broad. Front leg of male: pala elongate, nearly four times as long as broad, with about 38 pegs in a single row, a median longitudinal ridge on the outside of pala; tibia half as long as pala with pronounced dorsal carina and a large oval pad; femur slender, margins parallel, with pilose area on inner surface and a row of bristles extending from distal edge of pilose area to distal end of femur; trochanter with a hairy tumescence. Middle and hind legs slender, hind femur with several stout spines distally on front margin.. Proportional lengths of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42.2 : 28.9 : 28.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 93.7 : 123.3 : 41.8. Male asymmetry dextral; strigil small, elongate, of seven irregular combs. For details of male pala, abdomen, and genitalia see Plate XCI, figs. 2, 2a, and 2b. Female abdomen normal.

Comparative notes: This is closely related to *S. conocephala* but does not have the produced vertex of the male and the white line between corium and membrane is not so marked. Moreover, the dark figures of corium are transverse figures instead of tending to fuse into longitudinal series as they often do in *S. conocephala.*

Location of types: Described from 12 specimens taken in Mackinac Island by the writer August 19, 1925. Holotype, allotype and paratypes in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution (Plate XCII):

CANADA: *New Brunswick:* Lower Camp, June, 1943, N. Allison, 2 males.

Quebec: Montreal Island, April 26, 1903 (Bueno Coll.) 1 male.

Ontario: Minaki, June 30—July 4, 1928, J. McDunnough (recorded by Walley); Ottawa, July 18, 1913, J. I. Beaulne.

Manitoba: MacDonald, Aug. 9, 1937, H. T. Peters, 9 males, 22 females; Cowan, Aug. 7, 1937, C. L. Johnston, 1 male, 3 females; Hartney, July 31, 1937, Beamer and Peters, 6 males, 1 female; Mafeking, Aug. 3, 1937, C. L. Johnston, 5 males, 4 females; Red Deer R., Aug. 3, 1937, same collector, 1 male; Deepdale, Aug. 1, 1937, same collector, 1 male, 1 female; Birch R., Aug. 3, 1937, same collector, 1 male; Aweme, April 7, 1931, R. M. White (Walley record); same place, at light, Aug. 23, 1905, J. Fletcher (Walley record); Winnipeg, 1900, A. W. Hannam (Walley record); Cross Lake, June 3, 1921, C. G. H. (Wallis), 1 female.

Saskatchewan: Kinderline's Lake, Aug. 29, 1938, D. S. Rawson, 1 male; Redberry Lake, Aug. 26, 1938, same collector, 1 female; Long Lake, June 14, 1938, same collector, 1 male; Murray Lake, 1940, same collector, 1 male, 1 female; Pelly, Aug. 2, 1937, C. L. Johnston, 2 males, 1 female; same place and date, R. H. Beamer, 2 males, 1 female.

Alberta: Edmonton, Owen Bryant (Bryant Coll.), 2 males, 2 females; Tofield, same collector and collection, 1 male; Bilby, same collector and collection, 1 male; Edmonton, Aug. 7, 1915, E. H. Strickland (Walley record); Lethbridge, July 23, 1915.

British Columbia: Shafer Lake, Aug. 7, 1944, J. A. Munro, 1 male, 1 female, nymph; Nicola Lake, June 17, 1922, E. R. Buckell (Walley record).

N. W. T.: Athabaska R., about 2 mi. above Pelican R., nr. Ft.

McMurray, F. Harper (Walley record); (Canada Coll.) male (clasper ex.).

ALASKA: Ft. Yukon, May 24, 1912, J. M. Jessup, 1 female; Dall R., J. T. White (Abbott Coll.), 1 male.

U. S. A.: *Maine:* Fryeburg, Aug. 20, 1934, M. E. Griffith, 2 males, 1 female; Pennamaghane R., June 10, 1893, W. C. Kendall, 4 males, 5 females; Orono, April 20, 1912, H. M. Parshley (Parshley Coll.), 1 male, 2 females; same place, July 20, 1905, Me. Exp. Sta., 1 female; Paris, July 10, 1915, C. A. Frost, 1 male; Sebago L., Aug. 10, 1921, Hall (Wheeler Coll.); Lincoln, Sept. 3, 1934, H. G. Walker (U. S. N. M.), det. Feb., 1941.

Massachusetts: Forest Hills, May 3, 1922, R. F. Hussey (Hussey Coll.), 1 female; same place, Nov. 1, 1915, H. M. Parshley (Parshley Coll.), 1 male, 1 female; Saugus, June 21, 1914, F. W. Dodd, 1 male; Amherst, May 7, 1904, 3 females; Danvers, July 3, 1914 (Parshley Coll.), 1 male, 2 females.

Connecticut: New Haven, June 30, 1910, A. B. Champlain, 1 male, 2 females; Windham Co., Aug. 11, 1927, C. L. Hubbs (Mich. Coll.), 1 male; New Haven, June, 1910, A. B. Champlain, 1 male, 4 females; Hamden, April 24, 1911, B. H. Walden, 1 male.

Rhode Island: Kingston, Nov. 11, 1909, 9 males, 28 females. Black Island, July 25, 1910 (Parshley Coll.), 1 female.

New York: (Uhler Coll.), 1 female; Lava, Sullivan Co., June (Bueno), 1 male, 1 female; Long Island, Cold Springs Harbor, July 11, 1919, H. M. Parshley (Parshley Coll.), 1 male; White Plains, Jan. 20, 1909 (Bueno), 1 male, 1 female.

New Jersey: Lakehurst, June 16, 1917, L. B. Woodruff, 3 females; same place, March 30 (Bueno); Pitman, July 3, 1942, J. C. Bradley, 5 males, 2 females.

Pennsylvania: Shawville, April 23, 1941, John Bauer (Carn.) 5 males, 4 females; Erie, Presque Isle, Aug. 1940, G. E. Wallace (Carn.), 1 male.

Michigan: Mackinac Island, Aug. 19, 1925, H. B. Hungerford, 4 males, 6 females; Douglas Lake, Aug. 6, 1927, same collector, 4 females; same place and collector, July 18, 1923, 1 female; same place and collector, Aug. 15, 1923, 3 males; Burt Lake, July 29, 1930, same collector, 10 males, 12 females; Nigger Creek Mullett, Aug. 4, 1925, same collector, 1 male; Pellston, 1930, same collector, 4 males, 8 females; Cheboygan Co., July 11, 1938, same collector, 1 male, 1 female; same place, Aug. 14, 1918, R. F. Hussey (Hussey

Coll.), 1 female; Druid's Hill (Uhler Coll.), 1 male; Taquamenon R., Luce Co., May 20, 1925, J. Metzelaar (Mich.), 1 male, 10 females.

Iowa: June-July, 1940 (Iowa Wesleyan), 8 females.

Wisconsin: Dane Co., March 16, 1930, E. P. Breakey, 1 male, 4 females; St. Croix R., Aug. 17, 1928, Schultz and Tarzwell (Mich.), 8 males, 11 females.

Minnesota: Olivia, June 28, 1921, H. H. Knight, 1 male; St. Paul, June 20, 1921, H. B. Hungerford, 1 male, 26 females; same place and collector, July 11-14, 1921, 7 males, 13 females; same place and collector, July 31, 1921, 5 females; Bengal, Aug. 13, 1922, same collector, 1 male; Grand Marais, Aug. 13, 1922, same collector, 1 female; St. Louis Co., July, 1934, same collector, 5 males, 2 females; Minnehaha Cr., July 9, 1921, same collector, 10 males, 18 females; Cooley, Aug. 13, 1932, C. L. Johnston, 1 male; St. Paul, July 16, 1932, A. A. Granovsky, 1 male (Minn. Coll.); same place and collector, May, June, 1934, 14 males, 11 females; same place and collector, June 30, 1933, 1 male, 3 females; same place and collector, July 27, 1933, 1 male, 2 females; same place and collector, July, 1934, 22 males, 17 females; Faribault, June 14, 1934, same collector, 2 males, 2 females; Olivia, June 28, 1921, H. H. Knight (Minn.), 9 males, 15 females; St. Paul, July 11, 1921, H. B. Hungerford (Minn.), 4 males; same place, June 27, 1921, W. E. Hoffman (Minn.), 12 males, 50 females.

North Dakota: Ft. Totten Lake, Aug. 7, 1919, C. Thompson, 2 males, 2 females; Lake Metagoshe, July 30, 1937, Beamer, Johnston and Peters, 2 males, 2 females; Turtle Mts., Aug. 3, 1920, R. F. Hussey (Hussey Coll.), 1 male.

South Dakota: Weta, July 18, 1937, R. H. Beamer, 1 male; same place and date, H. T. Peters, 2 males; same place and date, C. L. Johnston, 2 males, 1 female.

New Mexico: Tajique, July 25, 1941, Burt Hodgden, 1 male, 1 female.

Sigara (*Arctosigara*) *penniensis* (Hungerford)

(Plate XCI, figs. 3, 3a-3b)

1928. ***Arctocorixa penniensis*** **Hungerford, H. B. Can. Ent., Vol. LX, p. 228, figs. 7 and 8.**
1932. ***Arctocorixa penniensis*****, Walley, G. S. Can. Ent., Vol. LXIV, No. 7, p. 158.**

Size: Length 7.1 mm. to 7.6 mm. Width across eyes 2.1 mm. to 2.3 mm.

Color: General facies dark. Pronotum crossed by 7 to 8 dark bands. Pale color transverse on base of clavus, narrower than brown and interrupted. Pale markings of corium short, transverse, wavy lines arranged in 2 to 3 longitudinal series. Pale line separates corium from membrane which is fairly evenly covered with pale markings. Embolium, head, limbs, and sides of thorax pale. Basal abdominal segments of male smoky.

Structural characteristics: Head about two-thirds as long as pronotal disk; postocular space greatest at inner angles of eyes, rear margins of eyes nearly straight; interocular space less than the width of an eye; vertex rounded but projecting beyond eye margins in both sexes as seen from above; face not hairy; male fovea oval, moderately depressed, not attaining eyes laterally; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 25 : 15 : 43 : 30 ♂ ; 1 : 2 : 3 : 4 :: 25 : 20 : 45 : 30 ♀ . Pronotal disk pointed laterally, median carina on anterior fourth, apex rather pointed; pronotum and hemelytra moderately rastrate, the latter with scattered pale hairs; pruinose area posterior to nodal furrow a little longer than that of claval suture. Lateral lobe of prothorax elongate, base slightly constricted, apex rounded; thoracic region not inflated laterally as seen from above, mesoepimeron narrow, with osteole near tip; metaxyphus small, triangular, broader than long. Front leg of female of usual shape. Front leg of male: pala elongate, faintly carinate on outside, 30 to 31 pegs in a single unbroken row lying close to the upper palmar row of bristles; tibia half as long as pala, with a short dorsal carina and a medium-sized, oval pad; femur relatively slender, sides parallel almost to distal margin, then ventral margin curving sharply upward, pilose area on inner surface near base; the trochanter with a hairy tumescence. Middle and hind legs slender; proportion of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 42.2 : 34.2 : 39.2. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 91 : 122.1 : 44.4. Male asymmetry dextral; strigil small, oval, of 4 regular combs. For details of male structures see Plate XCI, figs. 3, 3a, and 3b. Female abdomen with eighth ventral segment sinuous across tip. Anal lobes not incised on inner ventral margin.

Comparative notes: In this species the mesoepimeron is slightly narrower than the lateral lobe of the prothorax; it may be distinguished from *Subsigara fallenoidea* (Hungfd.), which also has this character, in not having the pale figures of the corium arranged in a transverse series.

Location of types: Described from 21 specimens taken by me in Penny Lake, Mich., Aug. 8, 1924. Holotype male, allotype female, 8 male and 11 female paratypes in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate XCII.)

CANADA: *Newfoundland:* 1939, G. A. Walton, 1 female.

New Brunswick: Lower Camp, June, 1943, N. Allison, 1 male, 1 female.

Manitoba: Cowan, Aug. 7, 1937, C. L. Johnston, 14 males, 11 females; same place and date, H. T. Peters, 7 males, 6 females; same place and date, R. H. Beamer, 3 females.

Saskatchewan: Pelly, Aug. 2, 1937, C. L. Johnston, 1 female; Sask. R. (Uhler Coll.), 1 male.

N. W. T.: Good Hope, Sept. 20, 1929, Owen Bryant (Bryant Coll.), 1 female.

British Columbia: Prince Rupert, Jan. 23, 1944, Norman Carter, 19 males, 11 females.

U. S. A.: *New York:* Old Forge, June 20, 1905 (Bueno Coll.), 1 male.

Rhode Island: Providence (Davis Coll.), 1 female.

New Jersey: Lahaway (Hussey), 2 females.

Michigan: Chippewa Co., Henry R., May 26, 1925, J. Metzelaar (Mich.), 1 male; Douglas Lake, July-Aug., 1923, H. B. Hungerford, 1 male, 1 female; Penny Lake, Aug. 8, 1924, same collector, 8 males, 10 females; Douglas Lake, summer, 1924, same collector, 2 males, 12 females; Mackinac Island, Aug. 19, 1923, same collector, 1 male; Pellston, road pool, 1930, same collector, 10 males, 39 females; Cheboygan Co., Aug. 16, 1918, R. F. Hussey (Hussey Coll.), 1 male, 4 females.

Minnesota: St. Louis Co., Aug. 14, 1922, H. B. Hungerford, 3 males, 44 females; Bengal, Aug. 18, 1922, same collector, 1 male, 4 females; Itasca Park, Aug. 21, 1922, same collector, 9 males, 14 females; Carlson, Aug. 8, 1922, same collector, 1 female; Beaver Dam, Aug. 12, 1922, same collector, 1 male, 3 females; Eveleth, Aug. 13, 1937, C. L. Johnston, 2 females; Minneapolis, Sept. 11, 1919, R. F. Hussey (Hussey Coll.), 1 female.

South Dakota: Weta, July 18, 1937, C. L. Johnston, 18 males, 13 females; same place and date, H. T. Peters, 7 males, 5 females; same place and date, R. H. Beamer, 3 males, 4 females.

Sigara (*Arctosigara*) *bicoloripennis* (Walley)

(Text fig. 7; wash drawing No. 42 on Plate VII)

1936. *Arctocorixa bicoloripennis* Walley, G. S. Can. Ent. LXVIII, p. 55, Pl. 2, figs. 5, 10. (Walley says close to *A. penniensis* Hungerford.)

Size: Length 5.7 mm. to 6 mm. Width across eyes 1.8 mm. to 2 mm.

Color: General facies light to medium brown. Pronotum crossed by 7 to 8 dark bands about as wide as pale interspaces, distal ones tending to coalesce laterally. Clavus cross-banded, the bands of middle portion coalescent along inner margin. Corial pattern more wavy and irregular, but still arranged in transverse series. Corium separated by a pale line from the membrane which has a reticulate pattern. Embolium, head, and limbs pale. Venter smoky with pale margins; distal portion of abdomen also pale.

Structural characteristics: Head about one-half as long as pronotal disk; interocular space less than the width of an eye; vertex smoothly rounded as seen from above; facial hairs few; male fovea oval, fairly shallow, and narrow, not attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 38 : 25 ♂ ; 1 : 2 : 3 : 4 :: 20 : 15 : 38 : 25 ♀. Pronotal disk rounded laterally and distally, with median carina on anterior third; pronotum and hemelytra heavily rastrate, the latter with occasional pale hairs; pruinose area of the embolar groove posterior to nodal furrow equal in length to that of the claval suture. Lateral lobe of prothorax elongate, its posterior distal angle slightly produced; mesoepimeron relatively broad (broader than lobe of prothorax), with osteole near tip; metaxyphus considerably broader than long with margins a right angle at tip. Front leg of female of usual shape. Front leg of male: pala slender, dorsal margin tapering to claw, peg row closer to palm than to dorsal margin and containing about 25 teeth; tibia about two-thirds as long as pala, with dorsal carina and an oval pad; femur relatively slender, ventral margin expanded at about the middle, pilose area on inner surface followed by a row of stouter hairs; trochanter with a tumescence. Middle and hind legs slender; proportions: Middle leg: femur : tibia : tarsus : claw :: 100 : 44.7 : 31 : 44.7. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 77.8 : 108.4 : 41.7. Male asymmetry dextral; strigil minute, transverse, of 3 combs. For details of male structure see text fig. 7. Female abdomen normal.

Comparative notes: Mr. Walley says this species is near *A. pen-*

niensis Hungerford. Its smaller size readily separates it from that species.

Location of types: Holotype male, No. 4046, allotype female, and 4 female paratypes from Minaki, Ontario, July 4, 1928, J. McDunnough; 1 male paratype, Brent's Lake, Summerland, B. C., Oct. 29, 1931, A. N. Gartrell. The above in the Canadian National Museum, Ottawa, Ont.; 1 male paratype from Glen Souris, Man., Sept. 21, 1922, N. Criddle, and 1 female paratype from Minaki, Ont., July 4, 1928, J. McDunnough in the Francis Huntington Snow Entomological Collections, University of Kansas. The female paratype is not *S. bicoloripennis* Walley but is my new species, *S. defecta.* The type series should be examined critically.

Data on distribution: (Plate XCII.)

CANADA: *Ontario:* The type series above.

Manitoba: Glen Souris, Sept. 21, 1922, N. Criddle, 1 male; Swan River, June 5, 1936, H. E. McClure, 1 male; same place, Aug. 2, 1937, C. L. Johnston, 1 male; Mafeking, Aug. 3, 1937, H. T. Peters, 24 males, 15 females; same place and date, C. L. Johnston, 7 males, 11 females; Hartney, July 31, 1937, H. T. Peters, 8 males, 9 females; same place and date, R. H. Beamer, 8 males, 5 females; Russell, Aug. 1, 1937, C. L. Johnston, 5 males, 4 females; same place and date, H. T. Peters, 1 female; MacDonald, Aug. 9, 1937, H. T. Peters, 16 males, 21 females; Cowan, Aug. 7, 1937, H. T. Peters, 2 females; Minnedosa, June 4, 1933, H. E. McClure, 1 female.

Saskatchewan: Prince Albert National Park, June 24, 1940, J. C. Stevenson, 2 males; same place and collector, Sept. 13, 1940, 1 male, 1 female; same place and collector, Aug. 17, 1940, 1 female; Pelly, Aug. 2, 1937, C. L. Johnston, 1 male.

U. S. A.: *Michigan:* Lake Gogebic, Aug. 18, 1937, R. H. Beamer, 1 male; Douglas Lake, Aug. 4, 1932, H. B. Hungerford, 1 female; Ann Arbor, April 17, 1921, R. F. Hussey (Hussey Coll.), 1 male; Washtenaw Co., Pittsfield, April 8, 1918, R. F. Hussey (Hussey Coll.), 1 male.

Wisconsin: Dane Co., March 16, 1930, E. P. Breakey, 1 male, 1 female; (C. F. Baker in U. S. N. M.), 2 males, 11 females.

Minnesota: Olivia, June 28, 1921, H. H. Knight, 1 male; Cooley, Aug. 13, 1937, C. L. Johnston, 7 males, 6 females; Stephen, Aug. 10, 1937, Beamer and Johnston, 1 male, 1 female; Pelican Rapids, Aug. 22, 1922, H. B. Hungerford, 1 male, 1 female; Detroit, July 18, 1922, C. E. Mickel, 1 male, 1 female; Faribault, April 11, 1934, A.

A. Granovsky, 1 male; Hibbing, August 16, 1922, H. B. Hungerford, 2 males, 2 females; Bengal, Aug. 16, 1922, same collector, 2 males, 7 females; Itasca Park, Aug. 21, 1922, same collector, 2 males, 2 females; (Uhler Coll.), 1 male, 1 female; St. Paul, July 16, 1922, A. A. Granovsky, 13 males, 5 females; same place and collector, June 29, 1931, 8 males, 4 females; same place and collector, July 4-26, 1933, 4 males, 2 females; same place and collector, June 1-25, 1934, 6 males; same place and collector, July, 1934, 9 males, 1 female; same place, June 19, 1921, H. B. Hungerford, 2 males, 3 females; same place and collector, July 14, 1921, 2 males, 1 female; same place and collector, June 20, 1921, 4 males, 3 females; same place and collector, July 28, 1921, 3 males, 7 females; same place, Oct. 3, 1919, R. F. Hussey (Hussey Coll.), 4 males, 3 females; Hennepin Co., Oct. 9, 1921, W. E. Hoffmann, 1 male; Minnehaha Cr., Aug. 9, 1921, H. B. Hungerford, 2 males; Benson, Aug. 23, 1922, same collector, 1 female; Olivia, June 28, 1921, H. H. Knight (Minn.), 5 males, 10 females; St. Paul, June 25, 1921, W. E. Hoffmann (Minn.), 1 female; Minnetonka L., July 15, 1921, H. H. Knight (Minn.), 1 male; St. Anthony Pk., June 30, 1921, same collector and collection, 1 female.

North Dakota: Turtle Mts., Lake Upsilon, Aug. 3, 1920, T. H. Hubbell, 4 females; Nelson Co., Aug. 25, 1922, T. L. Hankinson (Mich. Coll.), 1 male.

South Dakota: Weta, July 18, 1937, R. H. Beamer, 3 males; Brookings, July 23, 1919, H. C. Severin, 1 male.

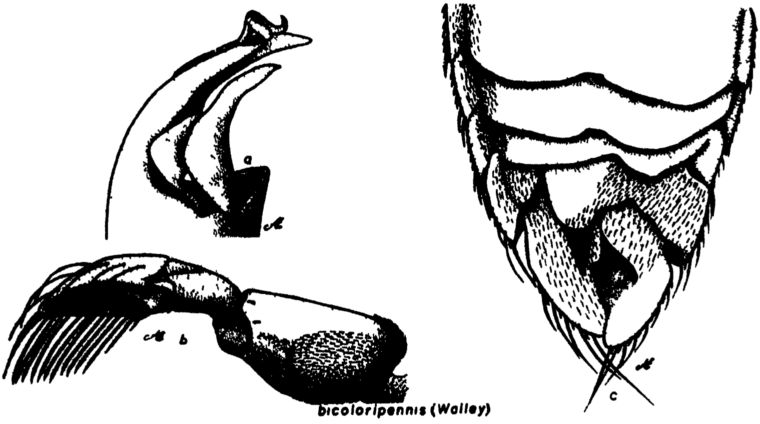


FIG. 7. *Sigara (Arctosigara) bicoloripennis* (Walley); (a) genital capsule of male; (b) front leg of male; (c) dorsal view of male abdomen.

PLATE XCI

Sigara Arctosigara subgenus new

FIG. 1. *Sigara* (*Arctosigara*) *conocephala* (Hungerford); dorsal view of male abdomen.

FIG. 1a. Front leg of male.

FIG 1b. Male genital capsule.

FIG. 2. *Sigara* (*Arctosigara*) *decoratella* (Hungerford); dorsal view of male abdomen.

FIG. 2a. Front leg of male.

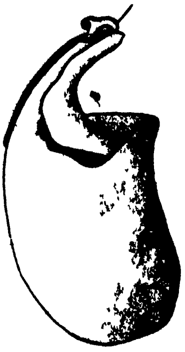
FIG. 2b. Male genital capsule.

FIG. 3. *Sigara* (*Arctosigara*) *penniensis* (Hungerford); dorsal view of male abdomen.

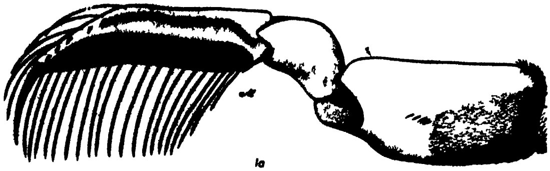
FIG. 3a. Front leg of male.

FIG. 3b. Male genital capsule.

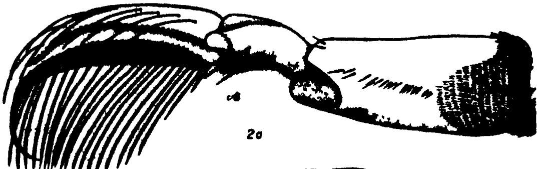
PLATE XCI



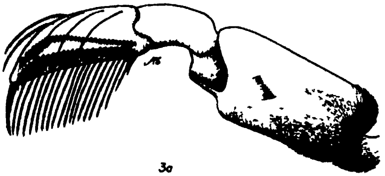
2b



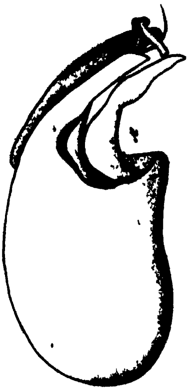
1a



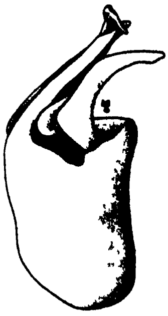
2a



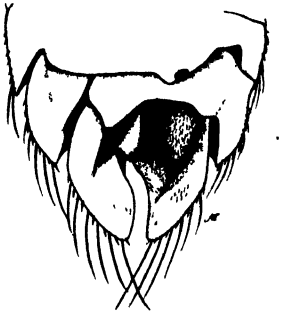
3a



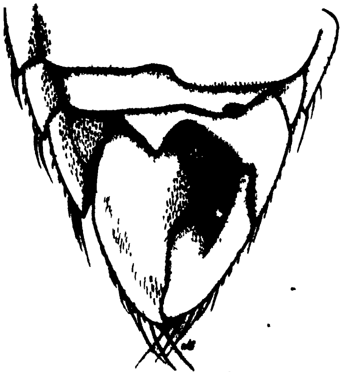
1b



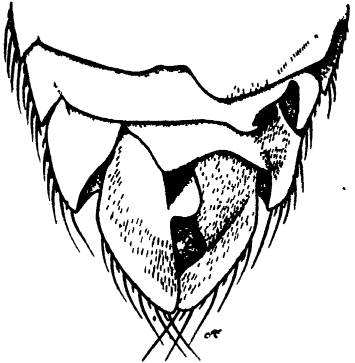
3b



3 penniensis (Hungfd)

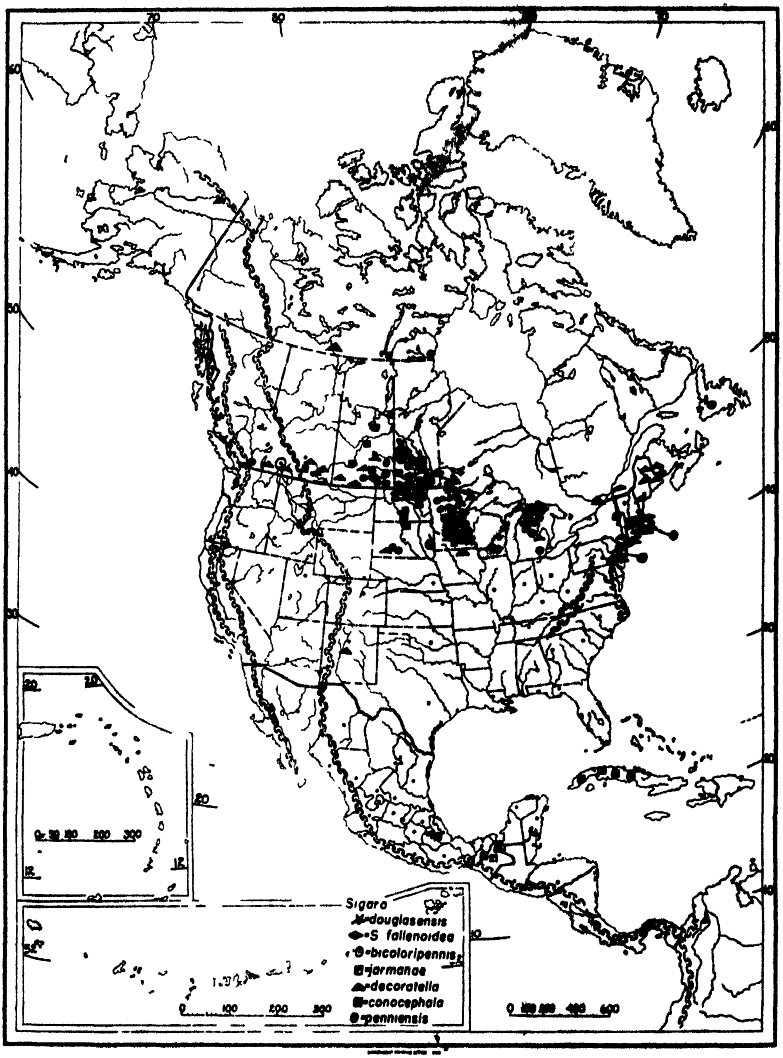


1 conocephala (Hungfd)



2 decoratella (Hungfd)

PLATE XCII


70
80
90
Sigara
✕-douglasensis
◆-S fallenoidea
⊙-bicoloripennis
■-jarmanae
▲-decoratella
■-conocephala
●-penniensis
0 100 200 300
0 100 200 400 600

Subgenus ALLOSIGARA new

Corixids having a broad, almost quadrate metaxyphus and palar claws that are strongly serrated on basal half. Subgenotype *S. decorata* (Abbott).

Sigara (*Allosigara*) *decorata* (Abbott)

(Text fig. 8; wash drawing 47, Plate VII)

1916. *Arctocorisa decorata* Abbott, J. F. Ent. News, Vol. XXVII, p. 341 (desc. from Mass.)

1917. *Arctocorixa decorata*, Van Duzee, E. P. Catalogue of Hemiptera . . , p. 479.

1917. *Arctocorisa decorata*, Parshley, H. M. Occasional Papers of the Boston Soc. of Nat. Hist., VII, p. 117.

1926. *Arctocorixa decorata*, Blatchley, W. S. Heteroptera of Eastern North America, p. 1071.

1926. *Arctocorixa decorata*, Hungerford, H. B. Bull. Brooklyn Ent Soc., Vol. XXI, p. 196.

Size: Length 8.2 mm. to 9.2 mm. Width across eyes 2.4 mm. to 2.8 mm.

Color: General facies rather dark. Pronotum crossed by 8 to 9 brown bands, posterior ones tending to coalesce laterally. Clavus cross-banded, dark bands rather broad and somewhat forked. Corium also cross-banded but with dark bands tending to coalesce into indefinite longitudinal lineations along inner and outer margins. Membrane separated from corium by a pale line, its pattern somewhat reticulate. Embolium, head, limbs and thorax pale; base of abdomen smoky, distal portion pale.

Structural characteristics: Head more than half as long as the pronotal disk; postocular space broader at inner angle of the eyes than in many corixids; interocular space slightly narrower than the width of an eye; vertex rounded out beyond eye margins in both sexes as seen from above; face slightly hairy; male fovea oval, narrow, and rather shallow; antennae: 1 : 2 : 3 : 4 :: 28 : 20 : 50 : 35 ♂ ; 1 : 2 : 3 : 4 :: 30 : 23 : 53 : 38 ♀. Pronotal disk short, pointed laterally and rather pointed distally; median carina visible on anterior third; pronotum and hemelytra heavily rastrate; pruinose area of embolar groove posterior to the nodal furrow longer than that of claval suture. Lateral lobe of prothorax elongate, its posterior distal angle produced, mesoepimeron narrow with osteole near tip; metaxyphus broad, almost quadrate, distal margin usually notched medianly. Front leg: claw of pala serrate at base in both sexes and femur concave on lower surface distally. Front leg of male: pala with dorsal margin curving from base to claw, with a diagonal ridge across palar face, and with 35 to 36 pegs in a row almost overlapping upper palmar row of bristles; tibia about half as long as pala and narrower, short dorsal carina, and an oval pad; femur relatively slender, with pilose area on inner surface. Middle and hind legs slender; hind femur and tibia each with row of short spines on dorsal surface; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42 : 31.5 : 42. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 87.5 : 119 : 42.2. Male asymmetry dextral; strigil relatively small, of 6 fairly regular combs. For details of male structure see text fig. 8. Female abdomen normal.

Comparative notes: The very broad, short, nearly quadrate metaxyphus and the strongly serrated base of the palar claw in both sexes will separate this species from all others.

Location of types: Holotype male, allotype female, labeled "Amherst, Mass., Aug. 26, 1904 (Coll. H. M. Parshley)," given by Dr. H. M. Parshley to the Francis Huntington Snow Entomological Collections, University of Kansas, Lawrence, Kansas.

Data on distribution: (Plate XCIX.)

Maine: Lincoln, Sept. 3, 1934, H. G. Walker, 1 female.

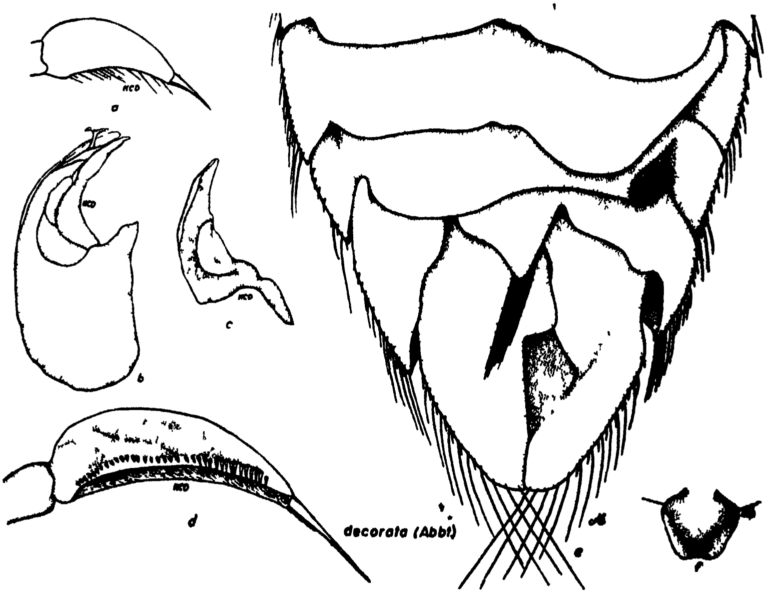


FIG. 8. *Sigara (Allosigara) decorata* (Abbott); (a) pala of female; (b) genital capsule of male; (c) left clasper; (d) pala of male; (e) dorsal view of male abdomen; (f) metaxyphus.

Massachusetts: N. Saugus, April 25, 1907, D. H. Clemons, 1 female; Amherst, Aug. 26, 1904 (Parshley) (type series).

Connecticut: Windham, Aug. 11, 1927, C. L. Hubbs (Mich.), 1 male.

Minnesota: Hennepin Co., Oct. 20, 1921, W. E. Hoffmann (Minn.), 1 male; Olivia, June 28, 1921, H. H. Knight (Minn.), 4 males, 3 females; St. Anthony Park, July 10, 1921, H. H. Knight (Minn.), 1 male; St. Paul, June 25, 1921, W. E. Hoffmann (Minn.), 2 females; Hibbing, Aug. 18, 1922, H. B. Hungerford, 8 males, 10 females; Carlson, Aug. 8, 1922, H. B. Hungerford, 1 female; St. Paul, golf pond, July 31, 1921, H. B. Hungerford, 1 male, 3 females; St. Paul, June-July, 1934, at light, A. A. Granovsky, 12 males, 6 females.

Illinois: Havana, Jan. 24, 1896, Hempel (Ill. Nat. Hist. Coll.).

North Dakota: Fargo, July 26, 1937, C. L. Johnston.

Subgenus *Xenosigara* new

Differs from subgenus *Sigara Sigara* in having the pruinose area of the claval suture short and in having a laterally inflated thorax. The left clasper of the male is armed with many pegs and the anal lobes of the female are deeply incised. Subgenotype *S. ornata* (Abbott).

Sigara (*Xenosigara*) *ornata* (Abbott)

(Text fig. 9; wash drawing No. 48, Plate VII)

1916. *Arctocorisa ornata* Abbott J. F Ent. News, XXVII, p 341 (desc. from N Y., Maine, Mass , and Conn.).

1917 *Arctocorixa ornata*, Van Duzee, E P Catalogue of Hemiptera . , p 483

1917. *Arctocorisa ornata*, Parshley, H M Occ. Papers of Boston Soc. Nat. Hist., VII, p. 117.

1923 *Arctocorixa ornata*, Abbott, J. F , *in* Guide to the Insects of Connecticut, Part IV, The Hemiptera or Sucking Insects of Connecticut, p. 389, fig. 36 (4), (10).

1926. *Arctocorixa ornata*, Blatchley, W S. Heteroptera of Eastern North America, pp. 1069-1071, Pl. XII, fig. 10.

1928. *Arctocorixa ornata*, Torre-Bueno, J. R. de la, *in* A List of the Insects of New York, p. 141 (Cornell Univ. Agri. Exp. Sta. Memoir 101).

1930. *Arctocorixa ornata*, Walley, G. S. Can. Ent , Vol. LXII, No 12, p. 281.

1946. *Arctocorixa ornata*, Proctor, Wm. Biol. Sur. of Mount Desert Region, Inc , Part VII, The Insect Fauna, p. 83 (estuary of Great Heath, Sta. F, 896, Mt. Desert Isld., Maine).

Size: Length 8.1 mm. to 9.2 mm. Width across eyes 2.4 mm. to 2.6 mm. General shape long and fairly slender.

Color: General facies varying from a little lighter than medium to almost black. Pronotum with 5 to 6 broad dark bands, the apical three coalescent along lateral margins of disk; pale interspaces narrow, often less than half as wide as dark bands. In dark specimens, the clavus and corium black with pale areas along margins and along sutures, and with a few small, pale splotches scattered through the dark areas; membrane with light and dark areas about equal. In lighter specimens the dark color is still dominant, but the pale areas are a little larger, more numerous, and arranged in transverse series, especially on clavus and distal half of corium. Embolium, head, limbs and venter pale in light specimens; smoky in dark specimens. Tarsal segments of hind legs sometimes suffused with red. The darker specimens are very striking in appearance.

Structural characteristics: Head nearly four-fifths to as long as pronotal disk; interocular space narrower than width of an eye; inner margins of eyes divergent; vertex projecting beyond curve of eyes in both sexes as seen from above; face not hairy; male fovea elongate oval, not very well defined; antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 20 : 48 : 30 ♂; 1 : 2 : 3 : 4 :: 25 : 20 : 50 : 32 ♀. Pronotal disk angulate laterally and apically, median carina plainly visible on anterior third; pronotum and hemelytra coarsely rastrate, the latter with a few pale hairs; pruinose area of embolar groove posterior to nodal furrow about two and one-half times as long as that of the claval suture. Lateral lobe of the prothorax elongate, sides parallel, tip truncate; mesoepimeron moderately broad with osteole half way between tip and lateral bend; thoracic region inflated laterally as seen from above; metaxyphus triangular, as broad as long, apex blunt. Front leg of female of usual shape except femur concave on inner side. Front leg of male: pala cultrate, blunt apically, with dorsal margin concave on basal third, peg row divided in middle with about 18 pegs in distal row and about 18 in basal one; tibia about a third as long as pala, almost as broad as long, appearing almost round, with no dorsal carina and with a small pad; femur flattened, with inner surface concave apically, and with about 10 rows of stridulatory pegs basally. Trochanter with a tumescence. Middle and hind legs slender, hind femur with several rows of pegs on dorsal surface, the proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.5 : 33.3 : 45.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 83.2 : 117.2 : 37.8. Male asymmetry dextral; strigil large, elongate oval, of 7 regular combs. For details of male structures see text fig. 9. Note that the left clasper is thickly set with stout pegs. Female abdomen with anal lobes deeply incised on inner ventral margin as shown in text figure.

Comparative notes: This is a unique species. The deeply incised anal lobes of the female, a character previously overlooked, make this very different from any other species in *Sigara.*

Location of types: Holotype male, labeled "Ithaca, N. Y., Aug. 26, 1891"; allotype female and 7 female paratypes labeled "Orono, Me., April 20, 1912, H. M. Parshley"; 4 female paratypes, same place, April 19, 1914, H. M. Parshley; 2 female paratypes; Cheshire, Conn., March 20, 1911, B. H. Walden, 1 female paratype, Amherst, Mass., Aug. 30, 1904. The holotype and allotype given to Francis Huntington Snow Collections. Others returned to Doctor Parshley.

Data on distribution: (Plate XCIX.) The published records include Quebec and Ontario in Canada and Maine, Massachusetts, Connecticut and New York in the United States. Besides the type material we have studied the following:

CANADA: *New Brunswick:* St. Croix River, Oct. 23, 1893, W. C. Kendall, 2 males, 9 females.

U. S. A.: *Maine:* Mt. Desert Island, Sept. 1, 1942, Wm. Proctor, 1 male.

Massachusetts: (Uhler Coll.), 2 females; Wellesley, Oct. 22, 1902, 1 female.

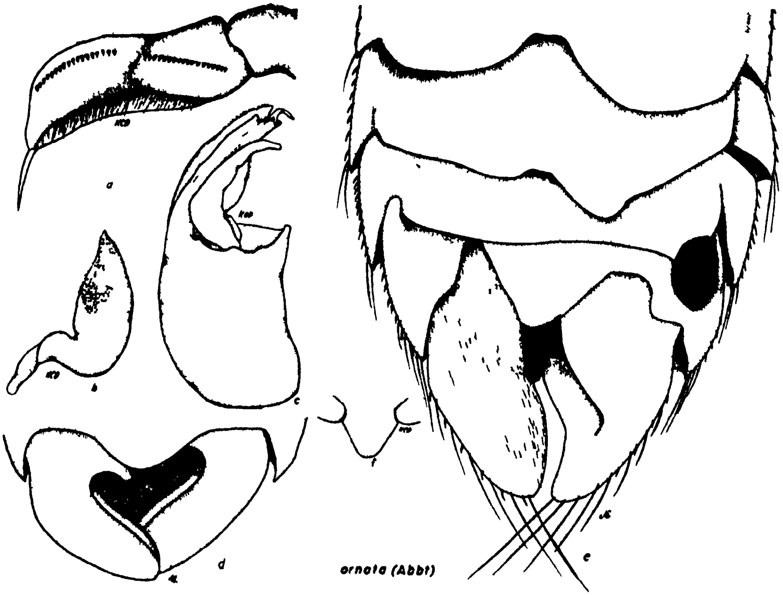


FIG 9. *Sigara (Xenosigara) ornata* (Abbott), (a) pala of male; (b) left clasper of male; (c) genital capsule of male; (d) ventral view of anal lobes of female abdomen; (e) dorsal view of male abdomen; (f) metaxyphus

New York: Ithaca, Spencer Lake, July 4, 1918, 2 males, 2 females; (Uhler Coll.), 1 male; Essex Co., July, 1916, 1 male.

Rhode Island: (Uhler Coll.), 1 male.

New Jersey: Trenton, 1 male, 1 female; Paterson, 2 females; Iona, July 7, 1938, J. C. Lutz III (Lutz Coll.), 2 males, 1 female.

Oregon: (Uhler Coll.), 3 females (U. S. N. M.).

Subgenus PILEOSIGARA new.

Shining rugulose species with cap-shaped head, hypo-ocular suture ending laterad of middle line of the eye, the infraocular portion of genae narrow. Subgenotype *S. douglasensis* (Hungerford).

Sigara (*Pileosigara*) *douglasensis* (Hungerford)

(Text fig. 10, wash drawing No. 32, Plate VI)

1926. *Arctocorixa douglasensis* Hungerford, H. B. Bull Brook. Ent Soc, Vol XXI, p. 196, figs. 1, 5 and 8.

1936. *Arctocorixa douglasensis*, Walley, G. S Can. Ent., Vol LXVIII, No. 3, p. 62 (records Minn.).

Size: Length 5.25 mm. to 5.8 mm. Width across eyes 1.57 mm. to 1.68 mm.

Color: General facies light. Pronotum crossed by 6 or 7 dark bands, a little narrower than pale interspaces. Pattern of clavus and corium of alternate, wavy, longitudinal bands of dark and light color. Dark pigment light reddish brown, light pigment brownish yellow. Pattern of membrane almost obliterated, separated from corium by brownish line. Embolium, head, limbs, and body pale yellow.

Structural characteristics: Head rounded, cap-shaped, four-fifths as long as pronotal disk, rear margin almost straight and bearing a median carina; postocular space at inner angles of eyes broader than in many corixids; inner margins of eyes nearly parallel; interocular space narrower than the width of an eye; vertex rounded; face not hairy; male fovea scarcely discernible; female face somewhat depressed; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 12 : 36 : 20 ♂ ; 1 : 2 : 3 : 4 :: 22 : 12 : 36 : 20 ♀ . Pronotal disk twice as broad as long, lateral and distal margins rounded; median carina visible on anterior third; pronotum rugulose to faintly rastrate; hemelytra smooth and shining, with scattered hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of the claval suture. Lateral lobe of prothorax elongate, anterior distal angle produced, tip obliquely truncate; mesoepimeron with base inflated, partially concealing the lateral lobe of the prothorax, broad distally with osteole remote from tip; metaxyphus about half as broad at base as long, tip pointed. Front leg of female of usual shape, about 20 hairs in lower palmar row of pala. Front leg of male: pala cultrate, dorsal margin smoothly curved from base to claw, 26 pegs in row following dorsal curve; tibia half as long as pala, short dorsal carina and no pad; femur slender with about 8 rows of stout stridulatory pegs on inner surface; trochanter with tumescence. Middle and hind legs slender; hind femur with 2 or, at the most, 3 stout pegs on distal portion of rear margin on ventral side; short row of additional pegs on ventral side; more than half of ventral side of femur pilose. Segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 35.8 : 26.9 : 35.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 77.2 : 100 : 40. Male asymmetry dextral; strigil large, elongate, of 6 regular combs; fifth segment with prestrigilar row of hairs; strigil itself surrounded by tufts of hair; median lobe of seventh abdominal segment projecting toward left, subtriangular. Right clasper of male genital capsule sickle-shaped, of same width throughout. The left clasper broad and blunt at tip. For details of male structures see text fig. 10. Female abdomen normal.

Comparative notes: This easily identified little species seems to stand quite alone.

Location of types: Described from 29 specimens, 11 males and 18 females, taken by the writer from Bryant's Bog near Douglas Lake, Michigan, in July and August, 1923. Holotype, allotype, and some paratypes in the Francis Huntington Snow Collections, University of Kansas. Other paratypes in the Museum of Zoölogy, University of Michigan, Ann Arbor, Michigan.

Data on distribution: (Plate XCII.) We have examined the following:

U. S. A.: *Minnesota:* Itasca Park, Aug. 21, 1922, H. B. Hungerford, 1 female; Minneapolis, Oct. 11, 1919, R. F. Hussey (Hussey Coll.), 5 males, 10 females.

Michigan: Cheboygan Co., July 9, 1918, R. F. Hussey, 1 male, 2 females; same place and collector, Aug. 18, 1918, 6 males, 6 females; Douglas Lake, Bryant's Bog, H. B. Hungerford, summer 1923, 9 males, 17 females; same place and collector, 1925, 13 males, 9 females; same place and collector, 1924, 1 male.

Pennsylvania: Philadelphia, May 30, 1928, J. C. Lutz (Lutz Coll.), 1 male, 1 female.

Massachusetts: F. Blanchard, 3 males, 8 females.

New Jersey: Riverton, Aug. 17, 1902, E. P. Van Duzee, 1 female; (P. R. Uhler Coll.), 1 female.

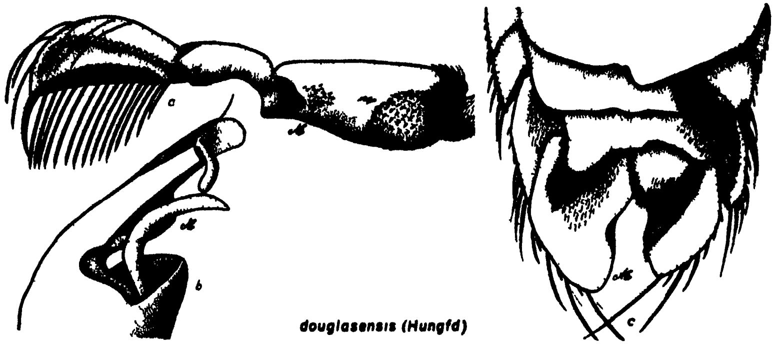


FIG. 10 *Sigara* (*Pileosigara*) *douglasensis* (Hungerford); (a) front leg of male; (b) genital capsule of male; (c) dorsal view of male abdomen

Subgenus APHELOSIGARA new

Medium sized corixids with semihyaline hemelytra as in *Morphocorixa*. Middle legs short but not unusually stout, the tip of the tarsus not surpassing the tip of hemelytra. Embolium broad. The male pala with a basal carina and the terminal flaps of the penial sheath modified. Subgenotype *S. jarmanæ* Hungerford.

Sigara (*Aphelosigara*) *jarmanæ* Hungerford

(Text fig 11, wash drawing No 40, Plate VII)

1939 *Sigara jarmanae* Hungerford, H B Jl of Kans Ent Soc , Vol XII, No 4, pp 133-134, text figures (desc from Mexico)

Size: Length 5 mm. to 6 mm. Width across eyes 1.68 mm. to 1.9 mm. General shape short and compact.

Color: General facies pale. Pronotum crossed by 7 to 9 narrow dark bands, apical ones tending to coalesce along lateral and rear margins of disk. Clavus with dark pattern etched away on inner basal angles, irregularly cross-barred elsewhere. Corium irregularly cross-barred, the dark lines broken and wavy. Membrane almost transparent with obscure brownish mottlings. Embolium, head, limbs and venter pale in both sexes.

Structural characteristics: Head about one-half as long as pronotal disk; rear margin of head caudally produced in center and carinate, especially in male; interocular space narrower than width of an eye; male vertex slightly produced as seen from above; face not hairy; male fovea shallow, narrow, poorly defined; antennae: 1 : 2 : 3 : 4 :: 20 : 15 : 35 : 20 ♂.

Pronotal disk reduced, not reaching as far laterad as the patterned portion of the clavus, median carina on anterior fourth, lateral and distal margins rounded; pronotum faintly rastrate to rugulose and hemelytra rugulose, the latter with a few pale hairs. Lateral lobe of prothorax elongate, sides parallel, apex rounded; mesoepimeron narrow with osteole near the tip; metaxyphus long and narrow, apex pointed. Front leg of female of usual shape, with 18 to 20 hairs in lower palmar row of pala. Front leg of male: pala cultrate, carinate on dorsal margin near base, pegs in a single curving row nearer dorsal margin than palm, numbering about 30; tibia about two-thirds as long as pala, with no dorsal carina and a round, bulbous pad; femur slender with row of short hairs on distal third of inner surface, pilose area basally. Middle and hind legs slender; hind femur with one or two spines on dorsal surface. Segmentation as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 43 : 29.2 : 43. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 87.1 : 124.4 : 49.8. Male asymmetry dextral; strigil small, located at end of laterally projecting stalk, of about 6 regular combs. Male genital capsule with the penial sheath terminating in curiously shaped flaps. For details of male structures, see text fig. 11. Female abdomen with seventh abdominal segment slightly notched or sinuous ventrally on distal margin.

Comparative notes: This species I cannot associate with any of the corixid groups known to me and until related species are discovered, I am leaving it in *Sigara.*

Location of types: Described from 34 specimens labeled "Comitán, Chiapas, Mexico, Aug. 30, 1937, H. D. Thomas." Holotype, allotype and paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XCII.) Besides the type series we have the following:

MEXICO: *Chiapas:* Comitán, Aug. 30, 1937, H. D. Thomas, 9 males, 23 females; same place, Jan. 18, 1938, 1,800 m., Octavio Utrilla L., 105 males, 90 females; L. Tepancuapan, Aug. 28, 1937, H. D. Thomas, 3 males, 8 females; Ocozocoautla, Sept. 3, 1937, H. D. Thomas, 1 male, 2 females.

Puebla: Puebla, July 24, 1937, H. D. Thomas, 2 females.

CUBA: Santiago de las Vegas, Oct. 31, 1932, S. C. Bruner, 1 male, 1 female; Soledad, Feb. 14, 1925, J. G. Myers, 1 female; (Uhler Coll.), 1 male; Camaguey, Aug., 1924, J. Acuna, 1 male, 1 female; same place and collector, July 21, 1923, 1 male.

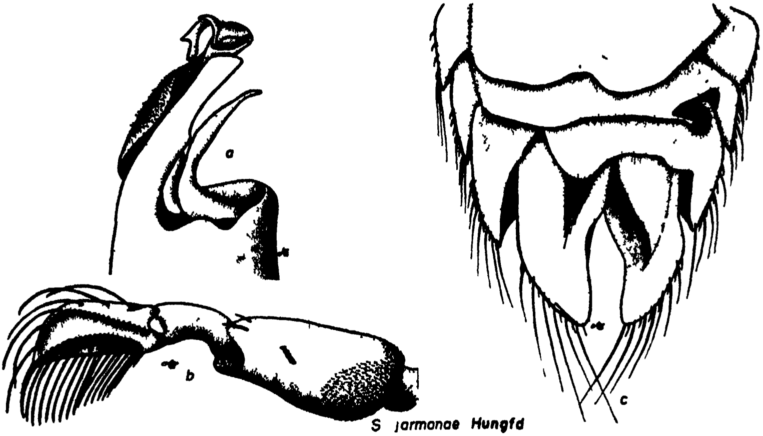


FIG. 11. *Sigara* (*Aphelosigara*) *jarmanæ* Hungfd ; (a) genital capsule of male; (b) front leg of male; (c) dorsal view of male abdomen.

Subgenus PEDIOSIGARA new.

Slender insects with short pronotum, laterally inflated thorax, very narrow infraocular area laterad of hypo-ocular suture which is short. Media vein of hemelytra close to cubitus. Face of male pala sparsely pilose. Subgenotype *S. hydatotrephes* (Kirkaldy).

Sigara (*Pediosigara*) *hydatotrephes* (Kirkaldy)

(Text fig. 12; wash drawing 14, Plate IV)

1908. *Arctocorisa hydatotrephes* Kirkaldy, G. W. Can Ent. XL, p. 119 (desc. from North Carolina).

1909. *Arctocorisa hydatotrephes*, Kirkaldy, G W, and Torre-Bueno, J. R. de la, catalogue *in* Proc. Ent. Soc. Wash., Vol. X, p. 195.

1913. *Arctocorisa hydatotrephes*, Abbott, J. F Bull. Brook. Ent. Soc., Vol. VIII, p. 82 (records Spring Creek, Decatur Co., Georgia).

1917. *Arctocorixa hydatotrephes*, Van Duzee, E. P. Catalogue of Hemiptera . . . , p. 481.

1926. *Arctocorixa hydatotrephes*, Blatchley, W. S. Heteroptera of Eastern North America, pp. 1073, 1074.

1938. *Arctocorixa hydatotrephes*, Brimley, C. S. Insects of North Carolina, p. 84.

Size: Length 5.3 mm. to 6 mm. Width of head across eyes 1.57 mm. to 1.7 mm. General shape long and slender.

Color: General facies black. Pronotum crossed by 3 or 4 narrow, pale lines, the rest almost solid black. Clavus, corium, and membrane black, but with sutures and margins pale, giving this insect a striking and unusual appearance. Embolium, head, and limbs pale; venter somewhat smoky.

Structural characteristics: Head equal in length to pronotal disk, occasionally longer, but forms all macropterous; vertex not produced, postocular space rather broad, especially at inner angle of eye, interocular space much narrower than the width of an eye; facial hairs few; male fovea hardly discernible; antennal segmentation: 1 : 2 : 3 : 4 :: 16 : 13 : 40 : 22 ♂ ; 1 : 2 : 3 : 4 :: 15 : 12 : 43 : 24 ♀ . Pronotum short compared to width, with faint indication of median carina on anterior fourth; pronotum rugulose to faintly rastrate, hemelytra somewhat rugulose, shining. Pruinose area of embolar groove posterior to nodal furrow considerably longer than the pruinose area of the claval suture. Lateral lobe of prothorax elongate, tip obliquely truncate; mesoepimeron broad with osteole remote from tip, almost in lateral bend of mesoepimeron, thoracic region inflated; metaxyphus about as broad as long, pointed apically. Front leg of female of usual shape with about 20 hairs in the lower palmar row of pala. Front leg of male: pala a thin, broad plate, rounded on dorsal margin; peg row following curve of dorsal margin, and consisting of about 20 pegs, those in middle smaller than those at either end; face of pala sparsely pilose between peg row and palm. Tibia wedge-shaped, about half as long as pala, without dorsal carina or pad, and with tuft of 3 or 4 hairs at center of distal margin; femur slender with pilose area covering almost the entire inner surface. Middle and hind legs slender; middle femur not spinose; middle tibia longer than tarsal claw; hind femur with 2 or 3 spines on dorsal surface. The proportions of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 41.8 : 28.4 : 33.4. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 80 : 100 : 40. Male asymmetry dextral; strigil small, oval, of 5 or 6 regular combs. For details of male pala, abdomen, and genitalia see text fig. 12. Female abdomen normal.

Comparative notes: This species is readily separated from other North American Corixidae by the distinctive color pattern, and by the male structures.

Location of types: I found in the Kirkaldy remnant collection 5 specimens (3 males and 2 females), labeled in Kirkaldy's handwriting *Corixa hydatotrephes,* that represent the type series from Raleigh, North Carolina, collected by C. S. Brimley. Two are labeled April, 1906, two in January and one in February. I have labeled one male lectoholotype, one female lectoallotype and the other three cotypes. All of these are in the Francis Huntington Snow Entomological Collection, University of Kansas.

Data on distribution: (Plate XXXVII.)

Georgia: Spring Creek, Decatur Co., June 7-23, 1911, J. C. Bradley, 5 males, 7 females; Perry, Aug. 13, 1939, J. D. Beamer, 1 male.

North Carolina: Raleigh, April, 1906, C. S. Brimley (Mich.), 3 males, 3 females; same place, April 4, 1906 (O. Heidemann Coll., Cornell U.), 5 females.

Alabama: Tuskegee, July 22, 1930, P. W. Oman, 40 males, 102 females.

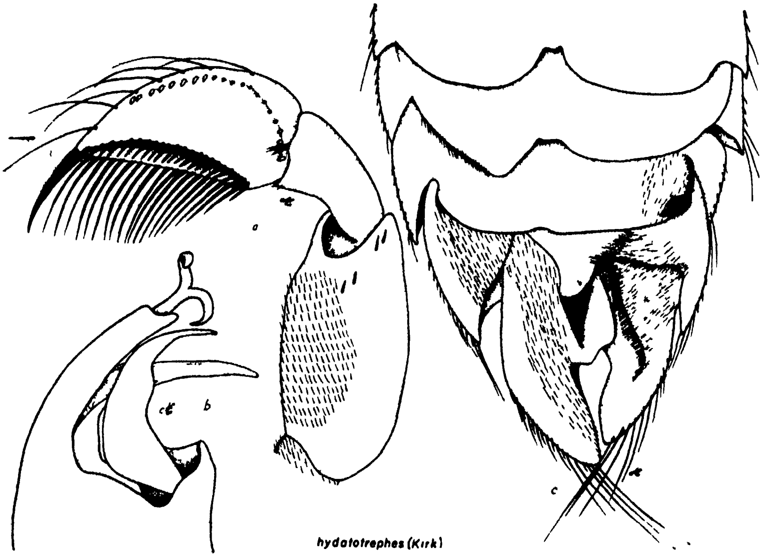


FIG. 12. *Sigara (Pediosigara) hydatotrephes* (Kirk.); (a) front leg of male; (b) genital capsule of male; (c) dorsal view of male abdomen.

Sigara (Pediosigara) depressa n. sp.

(Text figure 12A)

Size: Length 5.88 mm. to 6.4 mm. Width across eyes 1.9 mm. to 2 mm. General shape elongate and slender.

Color: General facies dark; pronotal disk with a median longitudinal pale stripe, the dark bands on either side numbering about seven and tending to coalesce distally, lateral margins of disk pale. Clavus with margins pale; some traces of cross bands basally, but solid black distally. Corium solid black with pale margins; plainly separated from membrane by a broad, pale band. Left membrane a little lighter than the right, both with dark, coalescent markings tending to become solid distally, tip of membrane and margins pale. Head, limbs, and thoracic venter pale in both sexes; abdomen of female pale; male with the first three abdominal segments black at base with lateral and distal margins pale. Embolar groove pale.

Structural characteristics: Head about half as long as the pronotal disk; interocular space: width of eye across rear margin :: 1 : 1½; vertex produced in both sexes, more so in male; facial hairs few; fovea of male clearly defined, but small, with the vertex slightly produced above it and a slight ridge below it across the frons, giving the fovea somewhat the shape of a Gothic arch; antennal segments as follows: 1 : 2 : 3 : 4 :: 20 : 12 : 40 : 25 ♂; 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 25 ♀. Pronotal disk: breadth : length :: 100 : 58.6; median carina plainly visible on basal third; disk rugulose to faintly rastrate. Hemelytra rugulose to faintly rastrate with scattered pale hairs. Postnodal pruinose area noticeably longer than the claval pruinose area. Claval pruinose area equal in length to the meron. Lateral lobe of prothorax elongate, sides parallel, apex bluntly rounded. Mesoepimeron at level of the scent gland osteole more than twice as broad as the lateral prothoracic lobe; osteole near or at lateral bend. Metaxyphus broader than long, apex pointed.

Foreleg of female of typical shape, the pala not dorsally depressed. Foreleg of male: pala elongate, the dorsal margin bent inward distally; face of palm below peg row pilose; the peg row divided, with 13 pegs distally along the dorsal margin and 12 pegs basally; one or two isolated pegs may be present between these two rows. Tibia about two-thirds as long as pala with a short dorsal carina and a pad fringed by long hairs; femur slender with about 8 to 9 rows of stridulatory pegs.

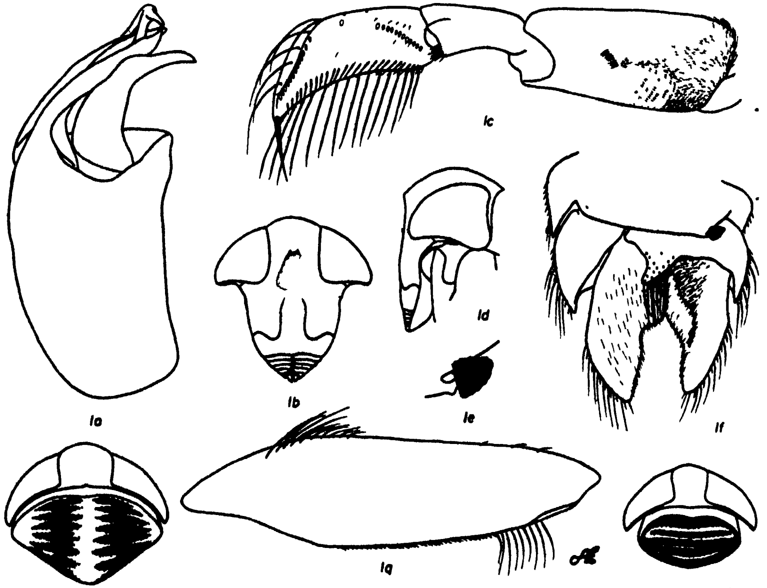
Middle and hind legs long and slender; dorsum of hind femur with two pegs. Measurements of segments (average of 3 specimens): Middle leg: femur : tibia : tarsus : claw :: 100 : 44 : 26.9 : 47.3; Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 83.5 : 115 : 40.3.

Male asymmetry dextral, strigil small, triangular, with 5 regular combs. For details of genital capsule and other male structures see text figure 12A. Female abdomen normal.

Comparative notes: Although this species is closely allied to

Sigara hydatotrephes (Kirk.), the palae and claspers of the males are different. Both sexes of *depressa* may be distinguished from the latter species in that the meron and the claval pruinose area are equal in length, whereas in *S. hydatotrephes* (Kirk.) the meron is considerably shorter than the claval pruinose area.

Location of types: Holotype male, allotype female, and 2 male and 3 female paratypes labeled "Zion's Crossing, Virginia, July 31, 1947, M. L. Bobb." Also 25 male, 23 female paratypes, same place, Mar. 24, 1948; in Francis Huntington Snow Collections, University of Kansas.



1 Sigara depressa n sp

2 S hydatotrephes (Kirk)

FIG. 12A. (1) *Sigara depressa* n. sp., head and pronotal disk of ♂; (1a) genital capsule of ♂; (1b) cephalic view of head of ♂; (1c) front leg of ♂; (1d) lateral view of ♂ head; (1e) enlargement of strigil; (1f) dorsal view of ♂ abdomen; (1g) dorsal view of hind femur. (2) *Sigara hydatotrephes* (Kirk.), head and pronotal disk of ♂.

Subgenus SUBSIGARA Stichel

1935. Stichel, W. Illustrierte Bestimmungs Tabellen der Deutschen Wanzen. Lieferung 11, pp. 819-832 (subg. of *Sigara* to include. *fossarum* L., *scotti* Dgl. Sc., *glossata* Lundb., *falleni* Fieb., *italica* Jacs., and *distincta* Fieb.). Also Lief. 12, p. 832 (making *S fossarum* Leach type).

1936. Walton, G. A Trans. Soc. British Ent. III, p. 34 (subg. *Selecorixa* typified by *S falleni* Fieb. and including *scotti* Dgl. Sc., *fossarum* Leach, *distincta* Fieb., *falleni* Fieb., *longipalis* J. Sahlb. = *glossata* Lundb., and *pearcei* n. sp).

1943. China, W. E. The Generic Names of British Insects, Pt. 8. The Generic Names of the British Hemiptera-Heteroptera, p. 806 (subg. *Subsigara* Stichel).

Walton gives the following description of his subgenus *Selecorixa:* "The species are characterized by being elongate and narrow, with yellowish ground colour of the pronotum and hemelytra, and with dark brown transverse lineations becoming scattered posteriorly. The pronotum bears 5-11 transverse yellow lines, and the lateral lobes are long and linguiform; the metasternal xiphus is very short, the margins almost straight; the upper surface of the posterior femora possesses a longitudinal row of 6-13 spines. The males have a small shallow impression upon the frons; large thin palae, broad in comparison to the short tibia, and with the rows of pegs arranged obliquely across the inner surface; small ovate strigil and simple curved lunate right claspers. The left and right portions of the seventh abdominal segment attached only at two points."

I may add to Walton's description that all the males have the left clasper adorned with many pegs and the face of the pala appears pruinose or minutely pilose.

Sigara (*Subsigara*) *fallenoidea* (Hungerford)

(Text fig. 18)

1926. *Arctocorixa fallenoidea* Hungerford, H B. Can. Ent. LVIII, p. 270, Pl. fig. 8.

Size: Length 6.9 mm. to 7.6 mm. Width across eyes 2.18 mm. to 2.22 mm.

Color: For color pattern of this subgenus see wash drawing No. 44, Plate VII. General facies medium brown. Pronotum crossed by 8 narrow, dark bands, the posterior 3 or 4 tending to coalesce along lateral and apical margins, anterior ones not extending all the way to lateral margins. Clavus and corium boldly cross-barred; the dark pattern of corium tending to coalesce toward outer margin; sutures pale. Corium separated from membrane by a pale and a dark line, side by side. Pattern of membrane reticulate. Embolium, head, limbs, and thoracic venter pale; abdominal venter smoky with pale margins.

Structural characteristics: Head about one-half as long as pronotal disk; interocular space equal to the width of an eye; inner margins of eyes divergent; vertex rounded out beyond eye curve in both sexes as seen from above; face not hairy; male fovea not well defined, fairly broad, but shallow; antennal segmentation: 1 : 2 : 3 : 4 :: 25 : 20 : 45 : 30 ♂ ; 1 : 2 : 3 : 4 :: 25 : 20 : 45 : 30 ♀. Pronotal disk a little more than half as long as broad, with median carina plainly visible on anterior third, lateral and apical margins angulate; pronotum and hemelytra heavily rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow equal to that of claval suture. Lateral lobe of prothorax elongate, sides parallel, apex rounded; mesoepimeron narrow with osteole near the tip; metaxyphus inflated, as broad at base as long, broadly rounded apically. Front leg of female of usual shape. Front leg of male: pala a thin, broad plate, dorsal margin curved inward and having 5 to 6 medium pegs a little past the middle, a row of about 20 to 24 very small pegs basally near the lower margin, inner surface of pala appearing pruinose, palm short as compared to length of pala; tibia short, about a third as long as pala and nearly as broad as long, with a short dorsal carina and no pad; femur slender, with a row of stout hairs about midway on inner surface, and with ventral surface flattened and bearing several rows of close-set hairs with thick bases, inner surface pilose at base. Middle and hind legs relatively slender; middle femur with row of short procumbent spines on ventral surface; hind tibia with row of similar spines on dorsal surface; these spines occur in both sexes; hind femur with row of spines on dorsal surface; segmental proportions as follows (ave. of 4 specimens): Middle leg: femur : tibia : tarsus : claw :: 100 : 46.5 : 30.6 : 33.95. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 95.2 : 127 : 34.8. Male asymmetry dextral; strigil minute, of 3 regular combs, located at end of a short flap. Median lobe of seventh abdominal segment elongate and shaped like the end of a knife; right margin of same segment with a sharp projection on upper end. For details of male pala, abdomen and genital capsule see text fig. 13. Female abdomen normal.

Comparative notes: Sigara pearcei Walton from Ireland is very close to this species. Walton, 1936, published a well illustrated paper on this group of Corixidae but did not mention *fallenoidea* because it is an American species. If relative length of middle tarsus to claw is a reliable character in this group as implied by Mr. Walton's key, then *fallenoidea* has a relatively longer tarsus than the similar European species.

Location of types: Described from a male taken by J. B. Wallis, VI, 10, 1911, Selkirk, Manitoba, Canada, which is the holotype. I now designate a female bearing the same data as the allotype. These are in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XCII.)

CANADA: *Manitoba:* Selkirk, June 10, 1911, J. B. Wallis, 1 male, 1 female (types).

Saskatchewan: Sept. 15, 1940, J. C. Stevenson, 1 male; Aug. 17, 1940, J. C. Stevenson, 1 male, 1 female.

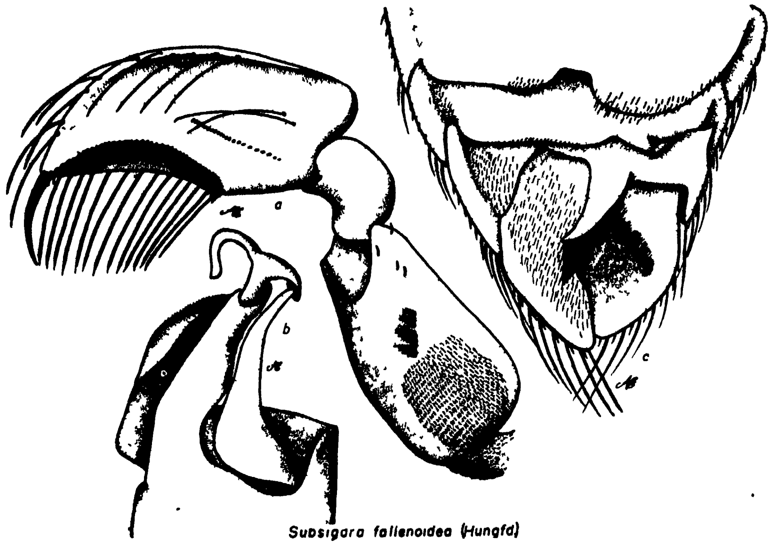


FIG. 13. *Sigara* (*Subsigara*) *fallenoidea* (Hungfd.); (a) front leg of male; (b) genital capsule of male; (c) dorsal view of male abdomen.

Subgenus LASIOSIGARA new

Strikingly longitudinally striped little species with surface roughened to coarsely rastrate, the hemelytra with appressed hairs. Thorax compressed, laterally inflated and hairy, the scent gland orifice on the lateral margin, guarded by a dense fringe of hair. The front femora hairy on basal anterior surface with smooth area beyond depressed.

Subgenotype: *N. lineata* Forster.

KEY TO SPECIES

A. Less than 4.25 mm. in length with two longitudinal dark stripes on corium. Antenna usually 3-segmented ... . *Sigara* (*Lasiosigara*) *lineata* (Forst.) (p. 645)

AA. More than 4.6 mm. in length with three longitudinal dark stripes on corium. Antenna 4-segmented .. ..*Sigara* (*Lasiosigara*) *trilineata* (Prov.) (p. 649)

Sigara (*Lasiosigara*) *lineata* (Forster)

(Text fig. 14; wash drawing No. 26, Plate V)

1771. *Notonecta lineata* Forster, J. R. Novae Species Insectorum Centuria I, p. 70.

1788. *Notonecta noveboracensis* Gmelin, *in* Linnaeus, Systema Naturae, 13th edn. i, Pt. 4, p. 2119 (unnecessary n. n. for *lineata* Forster).

1806. *Notonecta noveboracensis*, Turton, Linnaeus. Syst. Nat., 13th edn., Eng. trans. ii, p. 605

1872. *Corisa bilineata* Provancher, L. Naturaliste Canadien IV, p. 108.

1888. *Corisa bivittata* Provancher, L. Petite Faune Entomologique du Canada III, p. 208 (unnecessary n. n. for *bilineata* Provancher).

1900. *Corixa bilineata,* Osborn, Herbert. Ohio Acad. Sci. IX, p. 37 (= *bivittata* Prov. Dredged from shallow water, sandy bottom off Cedar Pt. beach, Lake Erie).

1909. *Arctocorisa bilineata,* Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, No. 3-4, p. 194.

1909. *Arctocorisa bivittata,* Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, No. 3-4, p. 194.

1909. *Arctocorisa lineata,* Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, No. 3-4, p. 196.

1909. *Arctocorisa noveboracensis,* Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, No. 3-4, p. 196.

1917. *Arctocorixa bivittata,* Van Duzee, E. P. Cat. of Hemiptera of America North of Mexico, p. 479.

1917. *Arctocorixa lineata,* Van Duzee, E P. Cat. of Hemiptera of America North of Mexico, p. 482.

1917. *Arctocorixa novaboracensis,* Van Duzee, E. P. Cat. of Hemiptera of America North of Mexico, p. 482 (unnecessary n. n. for *lineata*).

1917. *Arctocorixa bilineata*, Van Duzee, E. P. Cat. of Hemiptera of America North of Mexico, p. 479.

1926. *Arctocorixa bilineata,* Blatchley, W. S. Heteroptera of Eastern North America, pp. 1077-78.

1926. *Arctocorixa lineata,* Blatchley, W. S. Heteroptera of Eastern North America, p. 1079.

1928. *Arctocorixa lineata,* Torre-Bueno, J. R. de la, *in* A List of Insects of N. Y., p. 141, Cornell Univ. Agri. Exp. Sta. Memoir 101.

1929. *Arctocorixa bilineata*, Walley, G. S. Can. Ent. LXI, pp. 34-36, Plate 1, figs. 1-3.

1930. *Arctocorixa lineata,* Walley, G. S. Bull. Brooklyn Ent. Soc. XXV, No. 4, p. 203 (wrong determination).

1930. *Arctocorixa bilineata,* Walley, G. S. Can. Ent. LXII, p. 280.

1939. *Arctocorixa lineata*, Hungerford, H. B. Annals Ent. Soc. America XXXII, No. 3, pp. 585-586. (Says *A. bilineata* is syn. and reports from deep water.)

1942. *Arctocorixa lineata,* Shelford, V. E. Ohio Jl. Science, XLII, No. 5, pp. 184-185.

This strikingly marked little species was the first American corixid described. Forster called it *Notonecta lineata* and gave the following description:

"Pallida flava, elytris concoloribus; maculis nebulosis fuscis tribus longitudinalibus. Habitat in aquis provinciae Noveboracensis in America Septentrionli. Magnitudo 1/8 pollicis s. unciae Anglicanae. Antennae parvae sub capite, pone oculos, duorum articulorum, extimo clavato. Caput obtusum, flavum. Oculi brunnei. Thorax flavus, lineis tribus transversis fuscis. Elytra flexilia flava, punctis nebulosis fuscis, in lineas tres longitudinales digestis. Alae inferiores albae, pellucidae. Abdomen, Pedes, & Pectus pallide flava."

Size: Length 3.57 mm. to 4.23 mm. Width across the head 1.18 mm. to 1.34 mm.

Color: A longitudinally striped species, the ground color varying from pale lemon yellow to orange yellow, the pronotum crossed by 3 to 6 slender brown lines, usually 4. Commissure of hemelytra margined with yellow. Clavus yellow with the irregular oblique dark bars fused adjacent to the pale commissural line and not reaching lateral claval margin. Corium with two well-defined longitudinal black stripes which fuse anteriorly along the claval suture and occasionally are separated caudally only by a few pale marks. Membrane separated from corium by pale line, and marked by a submarginal black band which extends as irregular figures on to the middle field. Embolium pale. Head, legs and venter pale except the basal segments of the male venter may be brown.

Structural characteristics: Vertex broadly and evenly rounded. Interocular space narrower than an eye. Face of males slightly flattened with sparse yellow hairs. Antenna usually three-segmented, the tip of the third segment sometimes slightly constricted. (See drawing Text Fig. 14.) Occasionally a specimen may have a short fourth segment. Antennal segmentation: 3-segmented form: 1 : 2 : 3 :: 15 : 11 : 38 ♂ ; 1 : 2 : 3 :: 14 : 11 : 40 ♀ ; 4-segmented form: 1 : 2 : 3 : 4 :: 15 : 10 : 32 : 10 ♂ ; 1 : 2 : 3 : 4 :: 15 : 10 : 35 : 10 ♀ . Pronotal disk short, usually shorter than the head as seen from above, with a faint longitudinal carina on the anterior portion, median area roughened, tending to become rastrate laterally Clavus roughened to rastrate. Corium roughened. Hemelytra with scattered, appressed hairs Embolium broad, the nodal furrow and media vein usually not discernible. When nodal furrow can be located the embolar area posterior to it is long, half as long as the cubital ridge. The pruinose area along the claval fold is very long, more than half the length of the claval suture. The lateral lobe of the prothorax is elongate and slightly constricted at the base. The thorax compressed, the lateral margins covered with a dense pile, especially on the mesoepimeron; the scent gland osteole at lateral margin. Metaxyphus longer than wide, slender The front leg of male as shown in text figure 14, the number of palar pegs 23 to 25. The leg measurements as follows: 3-segmented form:

Middle leg: femur : tibia : tarsus : claw :: 100 : 40.9 : 30.3 : 40.9; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 86.9 : 102.2 : 33.7. 4-segmented form: Middle leg: femur : tibia : tarsus : claw :: 100 : 42.7 : 29.9 : 42.7. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.4 : 108 : 46.2. The hind femur armed above with a row of 6 to 8 stout spines. Abdominal asymmetry of the male dextral. The strigil of male small with two or three combs. The genital capsule without striking features, the right clasper pointed at tip. (See text figure 14.) Female abdomen with anal lobes notched on inner, ventral margin.

Location of types: The types of Forster's *Notonecta lineata* unknown. The types of Provancher's *Corisa bilineata* in the Quebec Public Museum.

Comparative notes: The small size and striking color pattern serve to distinguish this species from other American corixids. It is most like *S. trilineata* (Prov.), but is smaller in size and has two longitudinal stripes on the corium whereas the latter has three. For a comparison of the color pattern of the two see Plate V, figs. 26 and 27.

Data on distribution: (Plate XXXVII.) In Forster's description (1771) he says "Habitat in aquis provinciae Noveboracensis in America Septentrionali." For a hundred years the species was not rediscovered. Then Provancher (1872) described it as *Corisa bilineata* from Quebec, Canada, and in 1929 Walley redescribed and figured Provancher's species and reported collecting it in large numbers during May and early June along the stony shore of Lake Deschenes at Aylmer, P. Q., and Brittania, Ontario. He also reported six specimens taken by Criddle from Aweme, Manitoba.

In the U. S. National Museum there are a few specimens labeled as follows: "N. Ill. Etas Unis. W. H. Ashm. *Corixa signata* Say" 1 female; "P. R. Uhler Collection, Fox R. Ill., determined by Uhler as *Corixa signata* Fieb. var." 1 male, 2 females. We also have before us the following:

CANADA: *Saskatchewan:* Lost Mountain Lake, Sept. 7, 1940, D. S. Rawson, 1 male.

Manitoba: Swan River, June 5, 1936, H. E. McClure, 2 males, 3 females; Treesboro, July 25, 1910, J. B. Wallis (Wallis), 10 males, 8 females.

U. S. A.: *Minnesota:* Carlton (S. Louis River), Aug. 8, 1922, H. B. Hungerford, 52 males, 78 females; Beaver Dam (Cook Co.), Aug. 12, 1922, same collector, 36 males, 49 females; Taylor Falls, St. Croix River, Aug. 6, 1922, same collector, 18 males, 46 females; also by W. E. Hoffmann, same place and date, 3 males, 5 females; Pelican Rapids, Aug. 22, 1922, H. B. Hungerford, 1 female; Taylor Falls, Aug. 6, 1922, W. E. Hoffmann (Minn.), 31 males, 60 females, 3 nymphs; Minneapolis, April 6, 1922, same collector and collection, 45 males, 61 females.

Ohio: Put-in-Bay, Lake Erie, July 21, 1937, V. E. Shelford, Station No. 57, sand bottom at depth of 35 ft., 3 males, 2 females; July 29, 1937, Station No. 83, bottom of sand, gravel and shell at depth of 31 ft., 2 females; July 30, 1937, Station No. 88, trawled from 27 ft. mud bottom, 1 female; Aug. 3, 1937, Station No. 97, rock, gravel, mud, 18 ft. bottom, 2 females; Aug. 4, 1937, Station No. 101, dredged from 14 ft. bottom, sand, 1 male, 2 females.

Illinois: Galena, June 29, 1892, Hart and Shiga, 1 male (Ill. Coll.); Illinois, 1927, A. T. McClay (Usinger Coll.).

Pennsylvania: Erie, Presque Isle, pond nr. Thompson's Pond in ditch from lake, Aug., 1940, G. E. Wallace (Carn.), 80 males, 52 females.

Habitat notes: This little species seems to occur in turbulent waters along a wave-swept lake shore or in the rapids of rivers, often in the company of *S. trilineata* Provancher. When it was recovered from Lake Erie at depths up to 35 feet, it was a bit difficult to explain. However, it is possible that at the stations in the lake where these corixids were taken there may be considerable current.

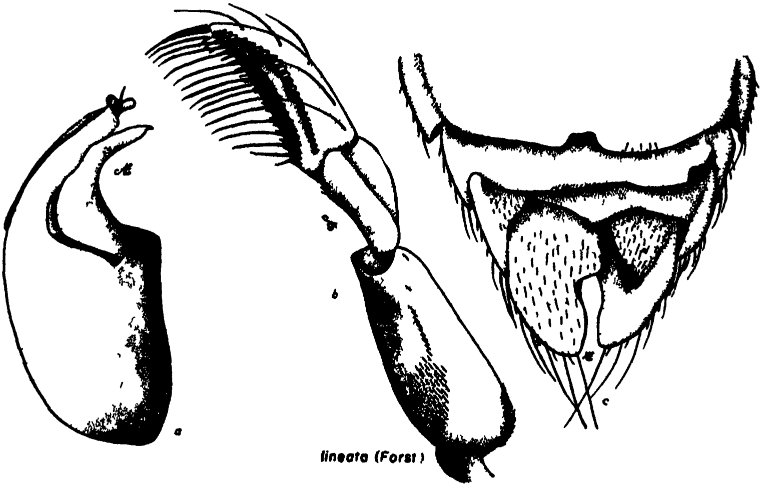


FIG. 14 *Sigara (Lasiosigara) lineata* (Forster); (a) genital capsule of male; (b) front leg of male; (c) dorsal view of male abdomen

Sigara (Lasiosigara) trilineata (Provancher)

(Text fig 15; wash drawing 27, Plate V)

1872. *Corisa trilineata* Provancher, L. Naturaliste Canadien IV, p 108

1888 *Corisa trivittata* Provancher, L. Petite Faune Entomologique du Canada III, p. 203. (Unnecessary n n. for *trilineata* Provancher.)

1909. *Arctocorisa ? trilineata*, Kirkaldy, G. W., and Torre-Bueno, J. R de la Catalogue *in* Proc. Ent. Soc. Wash. X, Nos. 3-4, p 197

1909. *Arctocorisa ? trivittata*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, Nos 3-4, p. 197.

1917. *Arctocorixa trilineata,* Van Duzee, E. P. Cat. of Hemiptera of America North of Mexico, p. 484.

1917. *Arctocorixa trivittata,* Van Duzee, E. P. Cat. of Hemiptera of America North of Mexico, p. 484 [says unnecessary new name for *A. trilineata* (Prov.)].

1917. *Arctocorisa trilineata,* Parshley, Howard M. Occ. Papers Boston Soc. Nat. Hist. VII, p. 118.

1923. *Arctocorisa trilineata,* Abbott, J. F., *in* Guide to the Insects of Connecticut, Part IV, "The Hemiptera of Connecticut," pp. 387-398, fig. 36 (14). (Wrong determination Probably *mullettensis* Hungerford.)

1926 *Arctocorixa trilineata,* Blatchley, W. S. Heteroptera of Eastern North America, pp. 1064, Pl. XII, fig. 14, pp. 1074-1076. (Wrong determination. Probably *mullettensis* Hungerford.)

1929. *Arctocorixa trilineata,* Walley, G S Canadian Ento., LXI, p 36, Pl. I, figs. 4, 5 and 6 (says figs. by Abbott in Hem. Conn. wrong).

1930. *Arctocorixa trilineata,* Walley, G. S. Canadian Ento. LXII, p 281.

1939 *Arctocorixa trilineata,* Hungerford, H. B. Annals Ent. Soc. America, XXXII, No. 3, p. 585.

1944. *Arctocorixa trilineata* (Provancher) Rawson, D. S., and Moore, J. E. Can. J. of Res., XXII, p. 182.

Size: Length 4.83 mm. to 6 mm. Width across head 1.54 mm. to 1.79 mm.

Color: A longitudinally striped species. General facies from moderately light to dark. In the pale forms the brown stripes are narrow. In the dark forms the dark brown to black bands are much broader than the yellow markings. The pronotum crossed by four or five transverse brown to black bands that may be slender or very broad. Claval oblique brown bands may be forked and often fused over a considerable portion. Corium with vermicular brown to black markings fused to form three well-defined longitudinal stripes, the membrane separated from the corium by a pale line, its surface covered with vermicular black markings. The membranes of both hemelytra about equally pigmented. Embolar area yellowish to fuscous. Three or four basal abdominal segments blackish except at margin.

Structural characteristics: Vertex broadly and evenly rounded. Interocular space about equal in width to an eye. Facial impression of male shallow, heart-shaped, with a few hairs. Antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 12 : 43 : 18 ♂; 1 : 2 : 3 : 4 :: 20 : 12 : 43 : 20 ♀. Pronotal disk a little longer than the head as viewed from above, with a short but distinct median longitudinal carina on anterior one-fourth, surface roughened, sometimes obscurely rastrate laterally. Clavus roughened to rastrate. Corium roughened, sometimes quite thickly covered with long appressed hairs. Embolar area normal. Lateral lobe of prothorax inflated, slightly constricted at base. Thorax compressed. Scent gland osteole far laterad, remote from end of mesoepimeron. Metaxyphus a little wider than long, bluntly rounded at tip, the sides forming an acute angle. The front leg of the male as shown in text fig. 15. On the basal half of the anterior surface of the femur there is a curiously depressed area surrounded by hairs. The male pala has from 22 to 24 pegs in the row. The leg measurements as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45 : 30 : 42. Hind leg; femur : tibia : tarsus 1 : tarsus 2 :: 100 : 91.5 : 115.7 : 52.6. The hind femur armed above with a row of four widely-spaced stout spines. Abdominal asymmetry of the male dextral, the strigil small, of six combs on a short lateral pedicle. The genital capsule as shown in text fig. 15. Female abdomen normal.

Comparative notes: *S. trilineata* may be distinguished from *S. lineata* (Forst.), the species most closely related to it, by its larger size and the fact that it has three longitudinal stripes on the corium instead of two. For a comparison of the color pattern of the two see Plate V, figs. 26 and 27.

Location of types: The types in the Quebec Public Museum.

Data on distribution: (Plate XXXVII.) Described from Quebec, Canada. Walley has published the following: *Prov. Quebec:* Aylmer (April, May, June); Fairy Lake (Aug.); *Ontario:* Lake Deschenes (May and June); Brittania (April, May, June); Arnprior (Sept.); Minaki (June); Point Pelee (June). We have before us the following:

CANADA: *New Brunswick:* St. Croix R., Oct. 23, 1893, W. C. Kendall (Mich.), 1 female.

Quebec: (Uhler Coll.), 3 females; Lake Temiscaming, H. H. Burton (Phil. Acad.), 1 male.

Ontario: Britannia, May 8, 1927, G. S. Walley, 2 males, 19 females; Ottawa, 4 males, 2 females.

Manitoba: Clear Lake, Aug. 8, 1937, C. L. Johnston, 30 males, 35 females; Red Deer River, H. T. Peters, Aug. 3, 1937.

Saskatchewan: Turtle Lake, May 13, 1940, D. S. Rawson, 1 female; S. Saskatchewan, Jackfish Lake, May 30, 1939, J. E. Moore, 3 males, 1 female; also Emma Lake, June 27, 1 male, 1 female; Turtle Lake, June 13, 1 female; Lost Mt. Lake, June 10, 1 female.

N. W. T.: Great Bear Lake, Kennet (Uhler), 2 males, 2 females; Great Slave Lake, Green Isl., June 25, 1945, D. S. Rawson, 6 males, 14 females; Athabaska Riv. Delta, June 13, 1945, D. S. Rawson, 1 female; Great Slave Lake, Frank Channel, July 6, 1944, D. S. Rawson, 2 females.

UNITED STATES: *Michigan:* Bois Blanc Island, Aug 14, 1932, H B Hungerford, 2 males, 3 females, Lake Gogebic, Aug 18, 1937, C L Johnston, 1 male, 1 female, Burt Lake, Cheboygan Co, June 26, 1929, H B Hungerford, 3 males, 5 females, also July 20, 1931, 2 males, 2 females, July 29, 1930, 71 males, 136 females, Temperance Pt, Lake Michigan, July 9, 1924, H B Hungerford, 31 males, 86 females, Cheboygan, July 18, 1932, J Leonard (Mich), 1 male

Wisconsin Clam R, Burnett Co, Aug 15, 1928, Schultz and Tarzwell (Mich), 1 male, 4 females

Minnesota Bengal, Aug 18, 1922, H B Hungerford, 9 males, 18 females, Carlton, Aug 8, 1922, H B Hungerford, 2 males, 1 female

Wyoming North Platte, Sept 2, 1926, George Cady, 10 males, 21 females, Upper N Platte, 7,300 ft, summer 1925, George Cady, 20 males, 8 females

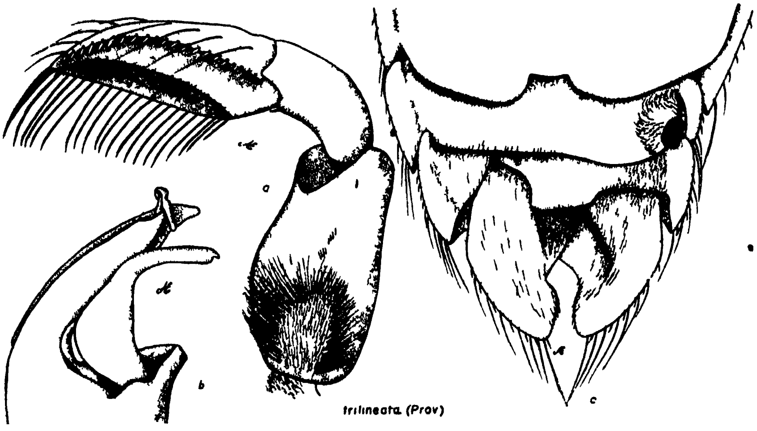


FIG 15 *Sigara* (*Lasiosigara*) *trilineata* (Prov), (a) front leg of male, (b) genital capsule of male, (c) dorsal view of male abdomen

The Subgenus *Vermicorixa* Walton*

1940 Walton, G A Trans Conn Acad Arts and Sci XXXIII, p 334 (as subg of *Corixa* Geoffroy)

1940 Hutchinson, G E Trans Conn Acad Arts and Sci XXXIII, p 427 (as subg of *Corixa* Geoff)

1943 Walton, G A Trans Soc for British Entomology, Vol 8, Pt 5 (Mar) pp 168, 166 (as subg of *Corixa* Geoffroy)

1943 China, W E Ent Mo Mag LXXIX (Apr) p 110

1943 China W E The Generic Names of British Insects Part 8 The Generic Names of the British Hemiptera-Heteroptera pp 282, 306 (subg of *Corixa* Geoffr)

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* Modified from Walton's description

Hemelytral pattern vermiculate; sculpture variable, from faintly rugulose to coarsely rastrate; frontal impression of male variable, from barely discernible to clearly defined; lateral lobes of prothorax linguiform; palae rather small, usually with a single, unbroken row of pegs in male; anterior tibiae with a few small apical spines in both sexes, usually carinate dorsally in the males, often with an apical pad; anterior femora of males usually without an area of thickened stridulatory hairs; metaxyphus short, linguiform to arrow-shaped, usually the latter; strigil variable in size, but generally small, and always present in Western Hemisphere representatives of this group; process of the genital capsule long, simple, usually finely ridged near apex; right clasper rather variable, but usually simply curved, often bearing a small hooklike projection apically. Venter of posterior femora pubescent at least on basal third, the glabrous portion with scattered spines; upper surface with from 2 or 3 to about a dozen short spines in a longitudinal row.

Sigara (*Vermicorixa*) *alternata* (Say)

(Plate XCIII, figs 2, 2a-2b Also colored plate)

1825 *Corixa alternata* Say, Thomas Jl Acad Nat. Sci Phila, IV, p 329 (described from Missouri)

1851 *Corixa alternata* Say, Thomas Complete Writings, LeConte Ed., Vol II, p 251 (Missouri)

1851 *Corisa alternata*, Fieber, F. X Species Generis Corisa, p 43 (unknown to him)

1851 *Corisa erichsonii* Fieber, F. X Species Generis Corisa, p 35, Tab. II, fig. 19 (Pennsylvania)

1876 *Corixa striata*, Uhler, P R Bull of U S Geol and Geog Surv of Territories, No 5, Vol. I, p 340 (Nebraska = *S. alternata* Say)

1876 *Corixa striata*, Uhler, P R List of Hemiptera . . . Reprint, separately paginated from Bull Geol and Geog Surv of Terr, No. 5 (2d ser), p 74 (British America and Nebraska).

1876. *Corixa alternata*, Uhler, P. R Bull. of U. S Geol. and Geog. Surv of Territories, No. 5, Vol I, p 303, Pl XXI, fig. 43

1876 *Corixa alternata* Forbes, S A List of Illinois Crustacea, Bull Ill. Mus. Nat. Hist., Vol I, pp 4-5 (Corixid eggs on crayfish). These undoubtedly were *Ramphocorixa acuminata* (Uhler) and not *S. alternata* (Say)

1877. *Corixa alternata*, Uhler, P R Wheeler's Report to Chief Eng. for 1877, p 1332 (San Juan River, N. Mex, Mr Browne). (We could not check this particular specimen, but we have other examples of *alternata* from New Mexico.)

1878 *Corixa alternata*, Uhler, P. R Proc Boston Soc. Nat. Hist., XIX, p 446 (Maine and New Hampshire. Two of the New Hampshire specimens are *Hesperocorixa atopodonta* Hungfd. and are labeled "No. 105?, Harris Coll.")

1883-84 *Corixa alternata*, Popenoe, E. A. Trans. Kans. Acad. Sci., IX, p 62 (Cherokee Co, Kan).

1888 *Corisa alternata*, Provancher, Leon. Pet Faune Ent. Can. III, Hémiptères, p. 203, Quebec (comparative notes).

1894 *Corixa alternata*. Van Duzee, E P. Bull. Buffalo Soc. Nat Sci. V, p. 186 (common in Niagara R. and around Buffalo, N. Y.).

1895. *Corisa striata*, Gillette, C. P., and Baker, C. F. Hemiptera of Colorado, p. 64 *in* Colo State Exp. Sta. 81, Tech. ser. 1 (Colorado = *S. alternata* Say).

1909. *Arctocorisa alternata*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash. X, p. 194.

1909. *Arctocorisa erichsonii*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la Catalogue *in* Proc. Ent. Soc. Wash. X, p. 195 (= *alternata* Say).

1913. *Arctocorixa alternata*, Abbott, J. F. Bull. Brookl. Ent. Soc., VIII, No. 6, pp. 87-90 (runs out in key; says it may occur in Georgia).

1914. *Corixa alternata*, Parshley, H. M. Psyche, XXI, No 5, p 140 (Orono, Maine. Part of these are *S. decoratella* Hungerford).

1916. *Arctocorisa parshleyi* Abbott, J. F. Ent News, Vol. XXVII, p. 342 (Maine, New York, Rhode Island).

1917. *Arctocorixa alternata*, Hungerford, H. B. Jl. N. Y. Ent. Soc., XXV, pp. 112-122, Pl. IX (life history).

1917. *Arctocorixa alternata*, Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico, p. 479.

1917. *Arctocorixa erichsonii*, Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico, p. 480.

1917. *Arctocorixa parshleyi*, Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico, p. 483.

1917. *Arctocorisa alternata*, Parshley, H. M. Occ. Papers of Bost. Soc. Nat. Hist., VII, p. 118 (Boston).

1923. *Arctocorixa alternata*, Abbott, J. F., *in* "Guide to the Insects of Connecticut," Part IV, "The Hemiptera or Sucking Insects of Connecticut," p. 389, fig. 36 (11). (Hamden and New Haven, Conn.).

1923. *Arctocorixa parshleyi*, Abbott, J. F., *in* "Guide to the Insects of Connecticut," Part IV, "The Hemiptera or Sucking Insects of Connecticut," p. 389, fig. 36 (12) (Connecticut).

1926. *Arctocorixa alternata*, Blatchley, W. S. Heteroptera of Eastern North America, pp. 1074, 1076, fig. 215, a; Pl. XII, fig. 11. ("Common in northern Indiana", also recorded from North Carolina and New York. "Ranges from N. Eng. to Ill. and south to Missouri.")

1926. *Arctocorixa erichsonii*, Blatchley, W. S. Heteroptera of Eastern North America, p. 1078 (Pennsylvania).

1926. *Arctocorixa parshleyi*, Blatchley, W. S. Heteroptera of Eastern North America, pp. 1074, 1077, fig. 12 (Maine, Rhode Island, New York and Pennsylvania).

1928. *Arctocorixa alternata*, Torre-Bueno, J. R. de la, *in* "A List of the Insects of N. Y.," Cornell Univ. Agri. Exp. Sta. Memoir 101, p. 141 (White Plains, L. I., Cold Spring Harbor, Flushing, and Maspeth).

1928. *Arctocorixa parshleyi*, Torre-Bueno, J. R. de la, *in* "A List of the Insects of N. Y.," Cornell Univ. Agri. Exp. Sta. Memoir 101, p. 141 (Ithaca, paratypes).

1928. *Arctocorixa alternata*, Hungerford, H. B. Ent. News, XXXIX, p 156 (Torrence Co., N. Mex.).

1929. *Sigara parshleyi*, Lundblad, O. Zool. Anzeiger, Bd. 80, Heft 7/9, pp 193-196, text figs. 1-5. (Redescription; specimen in Berlin Mus. taken in Massachusetts by Zimmermann).

1930. *Arctocorixa alternata*, Walley, G. S. Can Ent. LXIII, Dec., p 280 (Ottawa, Ont., and St. Jean and Montreal Isl., Que.).

1932. *Arctocorixa alternata*, Ricker, Wm E Studies of Trout Producing Lakes and Ponds, publ. of Ontaria Fisheries Res. Lab. No. 45, p. 132, *in* Univ. of Toronto Biol Series 36. (Records from stomach of trout.)

1938. *Arctocorixa alternata*, Brimley, C. S Insects of North Carolina, p. 84.

1939. *Arctocorixa alternata*, Millspaugh, Dick D. Field and Laboratory, Vol. VII, No. 2, May, pp. 84-85 (Dallas Co., Texas).

1945. *Corixa alternata*, Griffith, M. E. Univ. of Kans. Sci. Bull. XXX, Pt. II, No. 14, p. 251. [Cites Forbes' 1876 reference for species laying eggs on crayfish; = *R. acuminata* (Uhler)]

Size: Length 5.5 mm. to 6.9 mm. Width across eyes 1.7 mm. to 2 mm.

Color: General facies medium brown, sometimes with reddish tinge. Pronotum crossed by 8 to 9 narrow, brown bands, some of them only across median portion of disk, others complete, distal ones tending to coalesce along lateral edges. Clavus banded with alternate light and dark stripes of equal width. Corial pattern much broken, giving a mealy appearance—light and dark lines scattered, wavy, and broken; dark coloring tending to coalesce on inner distal angle of corium. This last is very characteristic of *alternata*. Membrane separated from corium by a pale line; pattern similar to that of corium. Embolium, head, limbs, and margins of venter pale. Area around coxae and basal segments of abdomen smoky to black.

Structural characteristics: Head about half as long as the pronotal disk; interocular space narrower than the width of an eye; vertex smoothly rounded in both sexes as seen from above, not projecting beyond curve of eyes; male fovea ovate, shallow, broad, almost attaining eyes laterally; antennae: 1 : 2 : 3 : 4 :: 20 : 15 : 38 : 32 ♂; 1 : 2 : 3 : 4 :: 21 : 14 : 40 : 32 ♀. Pronotal disk angulate laterally, rounded distally; median carina barely visible on anterior third; pronotum and hemelytra heavily rastrate, the latter with numerous long hairs on corium and membrane; pruinose area of embolar groove posterior to the nodal furrow slightly longer than that of the claval suture. Lateral lobe of prothorax elongate, sides parallel, apex somewhat rounded. Mesoepimeron at level of osteole narrower than the length of the last antennal segment; osteole close to tip of mesoepimeron. Metaxyphus plainly broader than long. Front leg of female of usual shape. Front leg of male: pala thin, rather broad compared to length, broadest across base, with about 42 pegs lying close to dorsal margin; tibia about two-thirds as long as pala, with dorsal carina, and a narrow pad; femur slender with pilose area on inner surface. Middle and hind legs slender; the proportions of segment to segment as follows (ave. 4 males, 4 females):

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.1 : 31.5 : 42.1. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.9 : 114.2 : 42.8. Male asymmetry dextral; strigil small, almost round, of seven fairly regular combs. For details of male structures see Plate XCIII, figs. 2, 2a, and 2b. Female abdomen normal.

Comparative notes: This is a very common species, separated from its relatives as indicated in the key.

Location of types: Original type lost. No. 105 in the Harris Collection was determined by Say and is this species. We have set up a neotype male, labeled "St. Louis, Mo., Oct. 1911, J. F. Abbott." This is in the F. H. Snow Entomological Collections, University of Kansas. Types of *erichsonii* Fieb. are supposed to be in Halle, Germany, and in the museum at Berlin but were not to be found in either place in 1928 when I visited these museums. Types of *A. parshleyi* Abbott: holotype male, allotype female, and 1 female paratype, labeled "Providence, R. I., 6/18 (Davis, Coll.)"; 1 male, "Ithaca, N. Y., July 20, 1904"; 1 female, "Ithaca, N. Y., Aug. 6, 1904"; 4 females, "Orono, Me., Sept. (Exch. Coll. Me. Exp. Sta.)"; the above series given by Doctor H. M. Parshley to the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution (Plate XCVII):

CANADA: *Nova Scotia:* Truro, Aug. 5, 1913, R Matheson, 1 male, 1 female.

Quebec: Montreal Island, 1 female

Ontario: Thunder Bay Beach, July 9, 1941, H. S Parish (Lutz); Toronto, May 9, 1930, E C Oakley (Lutz).

Manitoba: Aweme, Oct. 11, 1916, Norman Criddle (Walley record); Winnepeg, May 15, 1909, J. B. Wallis (Wallis Coll.), 2 males, 1 female; Stony Mts., May 28, 1910, same collector and collection, 2 males, 2 females; Roland, May 24, 1909, same collector and collection, 3 males, 2 females; Westbourne, Sept. 4, 1910, same collector and collection, 2 males, 2 females; Treesbank, July 25, 1910, same collector and collection, 2 females; Red Deer R., Aug. 3, 1937, R. H. Beamer, 2 males; Hartney, July 31, 1937, same collector, 6 males, 6 females; same place and date, H. T. Peters, 8 males, 8 females; Mafeking, Aug. 3, 1937, same collector, 1 male, 2 females; Russell, Aug. 1, 1937, same collector, 1 male; MacDonald, Aug. 9, 1937, same collector, 14 males, 22 females; Oakner, July 31, 1937, C. L. Johnston, 1 male; Clear Lake, Aug. 8, 1937, same collector, 2 females

Saskatchewan: Pelly, Aug. 2, 1937, R. H. Beamer, 4 males, 1 female; Qu'appelle R., 1940, D. S. Rawson, 1 male.

Alberta: Lethbridge, July 23, 1915, E. H. Strickland (Walley's record); same place, May 13-20, 1930, J. H. Pepper (Walley's record); Medicine Hat, July 23, 1930, same collector (Walley's record); Orion, June 29, 1930, same collector (Walley's record); Macleod, Sept. 15, 1928, Owen Bryant (Bryant); Medicine Hat, June 11, 1920, 1 male; Edmonton, May 6, 1924, Owen Bryant (Bryant), 1 female.

N. W. T.: 1 male.

U. S. A.: *New Hampshire:* Durham, Sept. 20, 1901, 1 male, 1 female.

New York: Putnam Co., 1903 (Bueno Coll.), 2 males, 2 females; Bronx Park, same collection, 1 male, 2 females; McLean, July 17, 1929, 1 male; Ithaca, Aug. 6-8, 1935, 2 males; Watkins Glen, L. I., Mrs. A. T. Slosson, 2 females; (Uhler Coll.), 1 male, 2 females; Ithaca, April, H. B. Hungerford, 4 males, 6 females; Rochester (Uhler Coll.), 1 female; White Plains, Aug. 29, 1908, 2 females; Long I., Sept. 25, 1937, J. C. Lutz (Lutz Coll.), 1 male, 1 female; Cyprus Hills, L. I., 1905, via C. J. Martin, 1 female; Batavia, 1913, H. H. Knight, 2 males, 3 females; W. Shokan, July 30, 1909, 2 females; Ithaca, Nov. 17, 1889, 8 males, 13 females; New York, 2 males, 3 females; Long Island, Queen's Village, Aug. 8, 1941, J. C. Lutz (Lutz); Cranberry Lake, July 24, 1919 (Drake Coll.), 2 females; Ithaca, Aug. 26, 1891 (Cornell), 2 males, 1 female.

Massachusetts: Northampton, Oct. 9, 1920, Louise Smith, 1 male, 1 female; Wellesley (Uhler Coll.), 1 female; Hartville, Aug. 11, 1930, J. R. de la Torre-Bueno (Bueno), 1 male; (Uhler Coll.), 1 female; Forest Hills, Nov. 1, 1915, H. M. Parshley (Parshley); Forest Hills, Oct. 21, 1921, R. F. Hussey (Hussey Coll.), 1 male.

Rhode Island: C. F. Baker, 1 female.

New Jersey: Palisades, Aug. 9-18, 1903 (Kirk. Coll.), 2 males, 11 females; Lakehurst, Aug. 17, 1912, 1 female; Iona, July 22, 1941, J. C. Lutz (Lutz).

Maryland: Sabillasville, Aug. 20 (Uhler Coll.), 2 females; Cabin John, Aug. 5, 1944, R. I. Sailer (Nat. Mus.), 1 male, 1 female.

District of Columbia: (Uhler Coll.), 1 male; Washington, May 18, 1903, W. V. Warner, 2 females; same place, D. H. Clemons, 1 female; same place (O. Heidemann, Cornell U.).

Virginia: New Church, July 15, 1934, L. D. Anderson, 3 females; Church Bridge, Aug. 30, 1906, D. H. Clemons, 2 males.

North Carolina: Raleigh, Nov. 22, 1904 (O. Heidemann, Cornell U.), 1 female.

West Virginia: Morgantown, Aug., 1923, 3 males; Preston Co., Aug. 26, 1928, 1 female; Kanawha Co., July, 1935 (Carn.), 1 male, 1 female.

Pennsylvania: Philadelphia, June 26, 1941, J. C. Lutz (Lutz Coll.), 14 males, 34 females; same place, collector and collection, 1929, 3 males, 6 females; same place, collector and collection, 1928, 1 male, 2 females; Newton Sq., July 1, 1941, same collector and collection, 2 males, 1 female; Philadelphia, May, 1906, H. Hornig, 1 female; Cameron, Aug. 21, 1946, L. D. Beamer, 2 males; Philadelphia, May 2, 1929, J. C. Lutz (Lutz), 1 male; same place, League

Isl. Park, June 26, 1941, J. C. Lutz (Lutz); same place, Morris Park, May 24, 1929, same collector and collection; Delaware Co., Newtown Sq., July 1, 1941, same collector and collection; Pennsylvania, H. S. Klages, 1 female.

Ohio: Lucas Co., 6 mi. w. of Toledo, Sept. 16, 1937, J. J. Friauf (Mich. Coll.), 4 males, 7 females; Berea, Oct. 19, 1911, C. J. Drake (Drake); Hocking Co., July 7, 1916, same collector and collection; Columbus, Oct. 2, 1914, same collector and collection; Tiffin, Aug. 26, 1916, same collector and collection; Delaware, June 26, 1916, same collector and collection; Columbus, July 7, 1930, C. H. Hicks (Lutz).

Indiana: Miller, Aug. 24, 1918, C. L. Hubbs (Field Mus.), 1 male, 1 female; Jasper Co., May 23, 1932, Wolcott (Field Mus.), 1 male; Mineral Springs, July 4, 1910, A. B. Wolcott (Field Mus.), 1 female; (Kirkaldy Coll.), 1 female.

Michigan: Berrien Co., E. K. Warren Preserve, July-Aug., 1920, R. F. Hussey, (Hussey Coll.), 11 males, 20 females; same place, collector and collection, June-Aug., 1919, 9 males, 12 females; (Uhler Coll.), 2 females; Druid Hill (Uhler Coll.), 1 male; Cheboygan Co., June 20, 1934, H. B. Hungerford, 1 male; same place and collector, July 30, 1939, 1 male, 3 females; Temperance Pt., L. Mich., July 9, 1924, same collector, 7 males, 4 females; Hat Island, L. Mich., July 4, 1943, same collector, 9 males, 8 females; Lake Gogebic, Aug. 15, 1937, C. L. Johnston, 1 male; Isle Royale, Aug., 1905, Adams (Mich. Coll.), 1 female; Ann Arbor, July, 1910 (Mich. Coll.), 8 males, 14 females; Washtenaw Co., May 25, 1918, F. M. Gaige (Mich. Coll.), 2 males, 7 females; Oceana Co., Silver L. State Pk., July 26, 1934, Olson and Gloyd (Mich.), 4 males, 1 female; Charlevoix Co., Beaver Island, Sept. 7-8, 1922, R. F. Hussey (Mich.), 19 males, 22 females; Huron Co., Pigeon Lake, July 3, 1922, R. F. Hussey (Mich.), 1 male, 1 female; Pentwater, July 17, 1916, E. Liljeblad (Field Mus.), 1 female; Ann Arbor, March 7, 1894, Wolcott (Nebr. Coll.), 1 male, 1 female; Battle Creek, Aug. 22, 1920, Priscilla Butler (Hussey); Douglas Lake, East Fish Tail Pool, July 26, 1923, H. B. Hungerford, 1 female; same place and collector, Sedge Point Pool, July 3, 1923, 2 females; same place and collector, Bryant's Bog, July 12, 1924, 3 males, 1 female; same place and collector, Mud Lake, July 31, 1923, 1 male; same place and collector, July, 1927, 13 males, 25 females.

Illinois: Palos Park, Sept. 13, 1908, W. J. Gerhard (Field Mus.), 1 female; So. Chicago, Sept. 14, 1902, same collector and collection, 8 males, 8 females; Chicago, Sept. 9, 1906, same collector and collection, 6 males, 10 females; Desplaines R. (Bueno Coll.), 2 males, 1 female; Chicago, 1904, same collection, 1 male, 1 female; Havana, Nov. 12, 1895, Hempel and Kofoid, 7 males, 8 females (Ill. Nat. Hist. Coll.); Ogle (Uhler Coll.), 1 male, 3 females; Normal, same collection, 1 male; same collection, 1 male; Chicago, C. T. Brues (Parshley); Palos Park, Sept. 14, 1913, W. J. Gerhard (Field Mus.), 2 males, 1 female; Gorham, Aug. 8, 1932, same collector and collection, 1 female; Lake Forest (Cornell), 1 male; Havana, Feb. 28, 1896, Hart and Taylor (Ill. Nat. Hist. Coll.); same place and collection, June 1, 1895, Hart; same place and collection, July 6, 1894, Hart; same place and collection, Jan. 24, 1896, Hempel; same place and collection, July 11, 1896, Hempel; same place and collection, July 6, 16, 1897, Hart; same place and collection, March 2, 1896, Hart; same place and collection, Dec. 23, 1895, Hempel; same place and collection, July 21, 1897, Hart; same place and collection, Aug. 11, 1894, Hart and Forbes; same place and collection, March 21, 1895, Hart; same place and collection, Oct. 11, 1894, Hart; same place and collection, Aug. 23, 1894, Hart, Smith, Newberry; same place and collection, Oct. 9, 1894, Hart; same place and collection, May 31, 1894, Hart.

Missouri: St. Louis, May, 1910, J. F. Abbott (Abbott Coll.), 6 males, 17 females; same place, June 10, 1919, W. V. Warner, 1 male, 2 females; (Uhler Coll.), 3 females; Kansas City, March 27, 1897, F. J. Hall, 1 female; Columbia, March 29, 1936, W. M. Gordon, 2 males, 4 females.

Arkansas: Washington Co., July 10, 1927, D. Isely, 3 males, 2 females.

Texas: (Riley Coll.), 4 females; Colorado Co., July 3, 1922, H. B. Hungerford, 1 male; Randall Co., July 7, 1927, R. H. Beamer, 15 males, 25 females; Valentine, July 13, 1927, same collector, 4 males; Colorado Co., April 25, 1922, Grace Wiley, 10 males, 21 females; same place and collector, April 3, 1922, 3 males, 4 females; same place and collector, April 24, 1922, 2 females; same place and collector, May 5, 1922, 3 females; Eastland Co., May 24, 1921, same collector, 4 males, 3 females; Ft. Davis, July-Aug., 1928, Mrs. O. C. Poling, 3 males, 1 female; Howth, May 30 (Uhler Coll.), 7 females; (Uhler Coll.), 2 males, 3 females; Victoria, Dec. 27, 1910, J. D. Mitchell, 1 female; Brewster Co., S. G. Ranch, April 15-30, 1936, O. C. Poling (Mich.), 7 males, 2 females.

Oklahoma: Cimarron Co., Kenton, July 8, 1926, T. H. Hubbell

(Mich. Coll.), 1 male, 2 females; Ardmore, April 14, 1923, H. B. Hungerford, 3 males.

Kansas: Franklin Co., May 13, 1927, Wesley Clinton (Mich. Coll.), 3 males; Onaga, 6 females; Clay Co. (Drake Coll.); Lawrence, May 6, 1937, L. J. Lipovsky, 2 females; Thomas Co., 3,150 ft., F. X. Williams, 2 males, 2 females; Douglas Co., April 29, 1936, L. J. Lipovsky, 1 male; Topeka, May 28, 1923, R. H. Beamer, 1 male, 9 females; Decatur, July 6, 1926, same collector, 2 females; Scott Co., June 21, 1925, same collector, 10 males, 20 females; same place, June 20, 1925, H. O. Deay, 8 males, 8 females; Hamilton Co., 3,350 ft., F. H. Snow, 1 male; Republic Co., July 11, 1925, R. H. Beamer, 11 males, 18 females; Norton Co., July 7, 1925, same collector, 1 female; Medora, June 24, 1936, D. R. Lindsay, 1 female; Gove Co., 2,813 ft., F. X. Williams, 2 males, 2 females; Medora, June, 1923, C. O. Bare, 1 female; Baldwin, June, J. C. Bridwell, 2 males, 2 females; Douglas Co., F. H. Snow, 2 males, 1 female; same place, L. J. Lipovsky, 1 female; Greeley Co., 3,550 ft., F. X. Williams, 3 males, 5 females; Saline Co., July 18, 1923, R. H. Beamer, 2 males, 3 females; same place, July 14, 1923, L. C. Woodruff, 1 male; Norton Co., July 5, 1935, H. J. Grady, 1 female; Miami Co., 1915, R. H. Beamer, 1 female; Wilson Co., Aug. 2, 1923, Beamer and Lawson, 1 female; Sedgwick Co., 1,291 ft., 1916, R. H. Beamer, 2 females; Barber Co., 1,468 ft., 1916, same collector, 2 females; Cowley Co., March 16, 1921, W. E. Hoffmann, 1 male, 10 females; Douglas Co., Jan. 23, 1921, same collector, 1 male, 6 females; same place, Stubbs Pond, May 17, 1920, H. B. Hungerford, 40 males, 43 females; Douglas Co., Feb. 23, 1921, H. B. Hungerford, 10 males, 25 females; same place and collector, Feb. 15, 1921, 15 males, 8 females; same place, Oct. 28, 1921, Robert Guntert, 112 males, 194 females; same place, March, 1923, H. B. Hungerford, 7 males, 12 females; same place and collector, May 24, 1921, 1 male, 2 females; same place and collector, Nov. 3, 1922, 10 females; same place, Stubbs Pond, Nov. 27, 1922, same collector, 2 males, 12 females; same place and collector, April 8, 1921, 64 males, 120 females; same place and collector, 4 males, 7 females; same place, May 10, 1919, W. E. Hoffmann, 42 males, 67 females; same place and collector, July 6, 1920, 1 female; same place, 900 ft., R. H. Beamer, 1 female; same place, July 29, 1919, W. E. Hoffmann, 1 male; same place, May 17, 1916, H. B. Hungerford, 1 male, 1 female; same place and collector, May 30, 1916, 43 males, 57 females; same place, June, taken at light, 1 male, 1 female; Wallace Co., 3,440 ft., F. X. Williams, 3 males; Thomas Co., 3,150 ft., same collector, 1 male, 2 females; Decatur Co., 2,560 ft., same collector, 6 males, 4 females; same place, July 8, 1926, R. H. Beamer, 2 males, 7 females; Cherokee Co., Dec. 28, 1923, R. H. Beamer, 1 female; Butler Co., 1.285 ft., 1916, same collector, 1 male; Republic Co., July 11, 1925, same collector, 3 females; same place and date, H. J. Grady, 3 females; Allen Co., April 24, 1921, W. E. Hoffmann, 6 females; Woodson Co., Feb. 24, 1921, same collector, 3 males, 3 females; Atchison Co., July 11, 1924, R. H. Beamer, 5 males, 9 females; same place and date, E. P. Breakey, 4 males, 7 females; Scott Co., June 25, 1925, R. H. Beamer, 1 female; same place, June 22, 1925, Howard Deay, 2 males, 6 females; Topeka, May 26, 1923, H. B. Hungerford, 3 males, 3 females; Pratt Co., April 12, 1925, R. H. Beamer, 1 male, 11 females; Lyons Co., June 14, 1923, C. O. Bare, 3 females; same place, June 15, 1923, R. H. Beamer, 1 female; Kiowa Co., July 4, 1923, same collector, 1 female; same place, July 1, 1923, C. H. Martin, 1 female; Medora, July 3, 1927, L. D. Anderson, 2 males; same place, Sand Hills, June 25, 1923, R. H. Beamer, 1 male; same place, Aug. 27, 1925, at light, W. Brown, 2 females; Hodgman Co., July 17-25, 1917, 7 males, 10 females; Meade Co., 2,500 ft., F X. Williams, 6 males, 6 females; Sherman Co., 3,690 ft., same collector, 12 males, 1 female; Sheridan Co., 2,650 ft., same collector, 1 female; Wichita Co., 3,300 ft., same collector, 5 males; Cheyenne Co., 3,300 ft., 1 male, 1 female; Rawlins Co., 2,850 ft., same collector, 1 male; Gove Co., 2,813 ft., same collector, 6 males, 2 females; Neosho Co., 900 ft., June 26, 1920, W. E. Hoffmann, 1 male, 1 female; Ellsworth Co., July 12, 1923, C. H. Martin, 1 male; Smith Co., July 9, 1925, H. J. Grady, 1 male; Leavenworth Co., June 25, 1924, E. P. Breakey, 2 males, 1 female; McPherson Co., Clarence Bare, 1 female; Cheyenne Co., July 2, 1925, H. J. Grady, 3 males, 1 female; Osage Co., June, 1923, C. O. Bare, 4 females; same place, June 15, 1923, R. H. Beamer, 4 males, 7 females; Manhattan, Sept. 13, 1923, H. B. Hungerford, 1 male; Dickinson Co., July 19, 1923, R. H. Beamer, 3 males; Morton Co., July 20, 1924, C. O. Bare, 1 male, 4 females; Montgomery Co., 708 ft., 1916, R. H. Beamer, 3 females; Coldwater, June 19, 1927, H. B. Hungerford, 1 female; Douglas Co., trap light, summer 1930, P. B. Lawson, 1 male, 6 females; same place, Lake View, Oct. 3, 1925, H. B. Hungerford, 3 males, 4 females; same place, Stubbs Pond, Nov. 27, 1922, H. B. Hungerford, 2 males, 3 females; same place and collector, Nov. 3, 1922, 5 males, 4 females; Leavenworth Co., July 10, 1924, E. P. Breakey, 1 female; Coldwater, June 19, 1927, H. B. Hungerford, 2 males, 1 female; Lawrence, trap light, July, 1935, L. S. Henderson, 18 males, 25 females.

Nebraska: Lincoln, Nov., 1923, Owen Bryant (Bryant Coll.), 2 males, 1 female; same place, March 14, J. T. Zimmer (Neb. Coll.), 1 male, 4 females; same place, Oct. 1, 1898, Hart (Ill. Nat. Hist. Coll.).

Iowa: Keokuk, June, Shaffer, 1 female; Burlington, H. G. Griffetts, 1 female; (O. Heidemann, Cornell U.), 2 males, 1 female.

Wisconsin: Black River Falls, 1,896, 1 female; Dane Co., L. Wingra, April 19, 1930, E. P. Breakey, 2 males, 5 females; Lafayette Co., Argyll, Sept. 6, 1927, Creaser and Griffeth (Mich.), 1 female; Burnett Co., Clam R. nr. Webster, Aug. 13, 1938, Shultz and Tarzwell (Mich. Coll.), 1 female; Brule, Aug. 16, 1937, C. L. Johnston, 1 male, 1 female; Fond du Lac Co., Grand R., Fairwater, Aug. 28, 1925, Creaser and Jones (Mich.), 1 female; Sauk Co., Baraboo R., Aug. 31, 1927, Creaser, Stewart and Griffith (Mich.), 1 male, 6 females.

Minnesota: St. Paul, golf pond, July 14, 1921, H. B. Hungerford (Minn.), 10 males, 9 females; same place, June 14, 1921, W. E. Hoffmann (Minn.), 3 males, 9 females; Ramsey Co., L. Owasso, June 22, 1921, W. E. Hoffmann (Minn.), 2 females; Lake City, June 25, 1921, same collector and collection, 2 males, 1 female; Olivia, June 28, 1921, same collector and collection, 1 male, 2 females; Detroit L., fish hatchery, Oct. 22, 1941, M. E. Griffith, 60 males, 85 females; Becker Co., Shell Lake, Aug. 22, 1922, H. B. Hungerford, 18 males, 24 females; Pelican Rapids, Aug. 22, 1922, same collector, 13 males, 19 females; Carlson, Aug. 8, 1922, same collector, 26 males, 31 females; Two Harbors, Aug. 9, 1922, same collector, 1 female; Rochester, July 16, 1922, same collector, 6 females; Beaver Dam, Aug. 12, 1922, same collector, 1 female; L. Isabella R., Aug. 14, 1922, same collector, 1 female; Benson, Aug. 23, 1922, same collector, 2 males, 2 females; Minneapolis, July 22, 1921, same collector, 1 female; St. Paul, golf pond, summer, 1921, same collector, 39 males, 59 females; same place, June 29, 1931, A. A. Granovsky, 1 male, 3 females; same place and collector, July 16, 1932, 2 males, 1 female; same place and collector, summer, 1934, 5 males, 10 females; same place and collector, summer, 1933, 17 males, 15 females; Faribault, June 14, 1934, same collector, 3 males, 2 females; Cannon Falls, Aug. 16, 1934, J. D. Pletch, 1 male; Cooley, Aug. 13, 1937, C. L. Johnston, 5 males, 1 female; Hennepin Co., Minnehaha Creek, July 9, 1921, H. B. Hungerford, 17 males, 21 females; Stephen, Aug. 10, 1937, H. T. Peters, 4 males, 6 females; Ramsey Co., April 20, 1933, J. D. Pletch, 3 males, 1 female; St. Paul, June, 1921, W. E. Hoffmann, 24 males, 45 females (Minn. Coll.); same place, collector and collection, Aug. 16, 1921, 3 males, 3 females; same place, collector and collection, Oct. 13, 1921, 1 female; Princeton, July 20, 1921, same collector and collection, July 20, 1921, 5 males, 1 female; Bird's Island, Aug. 25, 1921, same collector and collection, 2 males, 3 females; Minneapolis, Aug. 17, 1921, same collector and collection, 5 males, 5 females; Hennepin Co., Oct. 20, 1921, same collector and collection, 4 females; Koochicking Co., Rainy L., Aug. 20, 1932, S. Moore (Mich.), 5 females.

North Dakota: Fargo, ditch w. of N. D. Ag. Coll., May 3, 1941, M. E. Griffith, 2 males, 15 females; Sanborn, July 27, 1937, C. L. Johnston, 3 males, 5 females; same place and date, H. T. Peters, 5 males, 6 females; same place and collector, July 23, 1937, 8 males, 7 females; Tappen, July 23, 1937, R. H. Beamer, 9 males, 20 females; same place and date, C. L. Johnston, 7 males, 4 females; Northwood, July 27, 1937, H. T. Peters, 15 males, 17 females; Tokio, July 28, 1937, R. H. Beamer, 36 males, 38 females; Driscoll, July 23, 1937, H. T. Peters, 4 males, 6 females; same place and date, C. L. Johnston, 9 males, 2 females; Knox, July 28, 1937, same collector, 1 male; L. Metagoshe, July 30, 1937, Peters, 6 males, 3 females; same place and date, R. H. Beamer, 8 males, 4 females; same place and date, C. L. Johnston, 1 female; Linton, July 23, 1937, H. T. Peters, 11 males; same place and date, R. H. Beamer, 1 male, 1 female; same place and date, C. L. Johnston, 5 males, 6 females; McVille, July 27, 1937, same place, 1 male, 2 females; same place and date, R. H. Beamer, 1 male, 2 females; Fargo, July 26, 1937, C. L. Johnston, 2 males, 4 females; same place and date, H. T. Peters, 2 males, 1 female; Omemee, July 29, 1937, same collector, 4 males, 9 females; Devil's Lake, Aug. 20, 1920, R. F. Hussey (Hussey Coll.), 12 males, 6 females; Ramsey Co., L. Irwin, Aug. 21, 1922, T. L. Hankinson (Mich. Col.), 4 females; Nelson Co., Stump L., Aug. 25, 1922, same collector and collection, 3 males, 7 females; Devil's Lake, Aug. 26, 1919, A. Olson (Mich.), 1 male.

South Dakota: Redfield, July 20, 1937, R. H. Beamer, 11 females; Wasta, July 17, 1937, same collector, 10 males, 10 females; same place and date, C. L. Johnston, 1 male, 1 female; same place and date, H. T. Peters, 3 males, 1 female; Columbus, Sept. 24, 1939, G. B. Spawn, 3 males, 2 females; Weta, July 18, 1937, C. L. Johnston, 5 males, 1 female; same place and date, R. H. Beamer, 7 males, 5 females; same place and date, H. T. Peters, 3 males, 4 females; Piedmont, July 17, 1937, same collector, 8 males, 3 females; same place and date, R. H. Beamer, 10 males, 17 females; same place and date, C. L. Johnston, 1 male, 1 female; Draper, July 19, 1937, R. H. Beamer, 3 females; Burdette, July 20, 1937, C. L. Johnston, 1 male, 1 female; Houghton, July 22, 1937, C. L. Johnston, 1 male, 1 female; Houghton, July 22, 1937, R. H. Beamer, 1 male, 6 females; Bradley, July 21, 1937, H. T. Peters, 7 males, 4 females; Eureka, July 22, 1937, same collector, 9 males, 2 females; Miller, July 20, 1937, same collector, 1 male, 6 females; same place and date, R. H. Beamer, 3 males, 3 females; Eden, July 21, 1937, same collector, 3 males, 4 females; same place and date, H. T. Peters, 6 males, 4 females; Blunt, July 19, 1937, R. H. Beamer, 5 males, 1 female; Jordan, June 13, 1942, G. B. Spawn (Severin Coll.); Chamberlain, July 22, 1942, H. C. Severin, same collection; Artesian, June 26, 1942, same collector and collection; Eden, June 20, 1942, G. B. Spawn, same collection; Presho, July 13, 1942, H. C. Severin, same collection; Bowdle, Aug. 11, 1942, same collector and collection; Roswell, Aug. 13, 1942, same collector and collection; Wessington, Aug. 12, 1942, same collector and collection; Ft. Thompson, Aug. 25, 1942, same collection and collector; Britton, June 4, 1942, same collector and collection; White Lake, June 6, 1942, same collector and collection; Platte, June 31, 1942, same collector and collection; Blue Dog Lake, Waubay, May 1, 1942, same collector and collection; Pringle, roadside pool, July 3, 1937, M. W. Sanderson, 4 males, 7 females.

New Mexico: Upton, July 20, 1941 (Nat. Mus.), 4 males, 5 females; (Uhler Coll.), 1 female; Torrence Co., summer 1925, C. A. Martin; Wagonmound, July 18, 1936, M. B. Jackson, 6 males, 4 females; Grady, July 16, 1936, same collector, 1 male; same place and date, R. H. Beamer, 3 males, 3 females; Organ, July 3, 1940, same collector, 3 females; Santa Fe, July 20, 1936, J. D. Beamer, 2 females; Eddy Co., July 9, 1927, P. A. Readio, 1 female; Organ, July 3, 1940, D. E. Hardy, 1 male.

Colorado: (Kirk. Coll.), 1 male; (Uhler Coll.), 1 male, 2 females; Mineral Co., Continental Divide, June 20, 1919, 1 male, 1 female; Pingree Park, Aug., 1925, Beamer and Lawson, 3 males, 1 female; same place, Aug., 1924, P. B. Lawson, 2 females; Boulder, June 28, 1931, L. D. Anderson, 5 males, 6 females; Lamar, Aug. 22, 1927,

P. A. Readio, 1 male; Hillside, 6 mi. S., Aug. 25, 1941, H. C. Severin; Boulder, July 11, 1932, C. H. Hicks (Lutz).

Wyoming: Yellowstone Park, Aug. 29, 1890, 2 females.

Washington: Mason Co., L. Cushman, July 12, 1919, F. M. Gaige (Mich. Coll.), 4 females.

California: Onyx, July 23, 1940, L. C. Kuitert, 1 male, 2 females; Yuba Co., Coquillett, 1 male, 1 female; (Uhler Coll.), 1 male, 4 females.

Arizona: Chiricahua Mts., July 5, 1940, L. C. Kuitert, 1 female.

Sigara (Vermicorixa) stigmatica (Fieb.)

(Plate XCIV, figs. 2, 17, 19, 23, 27)

1851. *Corisa stigmatica* Fieber, F. X. Species Generis Corisa, p. 36, Tab. II, fig. 22 ("N. Am.")

1909. *Arctocorisa stigmatica*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue in Proc. Ent. Soc. Wash., Vol. X, p. 197.

1917. *Arctocorixa stigmatica*, Van Duzee, E. P. Cat. of Hem. of Am. N. of Mex., p. 484.

1939. *Arctocorixa stigmatica*, Millspaugh, Dick D. Field and Laboratory, Vol. VII, No. 2, May, p. 85 [probably is *Sigara modesta* (Abbott)]

Size: Length 4.6 mm. Width across eyes 1.5 mm.

Color: General facies medium brown. Pronotum crossed by 6 dark bands, a little narrower than pale interspaces; dark bands not extending all the way to margins and distal ones not tending to coalesce. Clavus irregularly cross-banded; dark bands narrow and transverse basally and distally; in center, thicker and more irregular. Corial pattern broken and irregular; dark color tending to coalesce into longitudinal line close to claval suture; elsewhere, light and dark patches alternating in about equal portions. Membrane separated from corium by pale line; pattern reticulate. Embolium, head and limbs pale; abdominal venter nearly black.

Structural characteristics: Head about four-fifths as long as pronotal disk; interocular space narrower than the width of an eye; male vertex slightly produced beyond eye curve as seen from above; face not hairy; male fovea poorly defined. Since we have only the type specimen, no attempt was made to dissect out the antennae. Pronotal disk rounded laterally and distally, median carina plainly visible on anterior third; pronotum and hemelytra moderately rastrate, the latter without hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax elongate, sides nearly parallel, tip rounded; mesoepimeron broad with osteole almost at lateral bend; metaxyphus about as broad as long, apex blunt. Front leg of male: Pala long and slender, about two and one-half times as long as broad, 36 pegs in a single row as in Plate XCIV, fig. 17; tibia about half as long as pala, with a short dorsal carina and a small pad; femur slender with pilose area on inner surface extending two-thirds of way from base and followed by a small patch of short bristles. Middle and hind legs missing. Male asymmetry dextral; strigil small, of 3 regular combs. For details of male structures see Plate XCIV, figs. 2, 17, 19, 23 and 27.

Comparative notes: We have not found, in all our collecting, any specimens exactly like the one we have chosen as the lectotype. There are several close forms that we consider as sibling species and these are separated in the key.

Location of types: We have set up as lectotype a male specimen belonging to the Vienna Museum, labeled "Nord Amer."

Data on distribution: So far we have been unable to discover where in North America this form was taken.

Sigara (Vermicorixa) modesta (Abbott)

(Plate XCIV, figs. 1, 4, 7, 8, 13, 14, 16, 18, 20, 21, 22)

1916. *Arctocorixa modesta* Abbott, J. F Ent. News, XXVII, p 343 (Washington, D. C., Maryland and Virginia).

1917. *Arctocorixa modesta,* Van Duzee, E P. Catalogue of the Hemiptera, p. 482.

1926. *Arctocorixa modesta,* Blatchley, W. S Heteroptera of Eastern North America, pp. 1079-1080 (repeats Abbott's description and records).

1928. *Arctocorixa modesta,* Torre-Bueno, J. R. de la, *in* "A List of the Insects of New York," p. 141 (Cornell Univ. Exp. Station Memoir 101).

1930 *Arctocorixa modesta,* Walley, G. S. Can Ent., Vol. LXII, No. 12, p. 28 (Ontario, common in Rideau and Ottawa rivers). (These were probably *grossolineata* n sp)

1932. *Arctocorixa modesta,* Ricker, Wm E. Studies of Speckled Trout (*Salvelinus fontinalis*), Ontario, Pub. of Ontario Fisheries Research Lab No. 44, *in* Univ. of Toronto Press Biol. Series No. 36, p. 88.

1932. *Arctocorixa modesta,* Ricker, Wm. E. Studies of Trout Producing Lakes and Ponds, pub. of Ontario Fisheries Research Lab. No. 45, *in* Univ. of Toronto Press Biol. Series No. 36, p. 132.

Size: Length 4.6 mm. to 5.7 mm. Width across eyes 1.5 mm. to 1.9 mm.

Color: General facies medium to dark brown. Pronotum crossed by 6 to 8 fairly regular dark bands, about equal in thickness to pale bands. Clavus with dark color frequently etched away on inner basal angles; cross-banded, with dark bands of central portion heavier than those of basal and distal portions; seen with naked eye, this gives the insect the appearance of having a dark spot on central portion of clavus. Corium irregularly cross-banded, the brown coloration tending to coalesce near inner distal angle into longitudinal stripe; outer distal angle hyaline. Brown spot at distal end of embolar groove. Membrane separated from corium by a pale line; pattern mealy. Embolium, head, limbs and thorax pale; abdominal venter black basally, pale distally in males; pale throughout in females.

Structural characteristics: Head about two-thirds as long as pronotal disk; interocular space less than width of an eye; male vertex slightly produced as seen from above; face not hairy; male fovea oval, narrow, rather shallow; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 13 : 33 : 23 males; 1 : 2 : 3 : 4 :: 19 : 16 : 34 : 25 females. Pronotal disk rounded laterally and distally; median carina plainly visible on anterior third; pronotum and hemelytra moderately rastrate, the latter practically without hairs; pruinose area of embolar groove posterior to nodal furrow equal to that of claval suture. Lateral lobe of prothorax elongate, narrow, sides parallel, apex rounded; mesoepimeron inflated at base, nearly concealing the lateral lobe of the prothorax, broad distally with osteole about two-thirds of way to lateral bend; metaxyphus about as broad as long, apex pointed. Front leg of female of usual shape. Front leg of male: Pala a little more than twice as long as broad, about 35 pegs in a single row as in Plate XCIV, figs. 4, 13, 16 and 20; tibia two-thirds as long as pala, with long dorsal carina and a small pad; femur pilose on inner surface for half its length. Middle and hind legs slender; proportions as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.9 : 29.9 : 45.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 90.2 : 108.1 : 44.3. Dorsal surface of hind tibia with a row of short spines. Male asymmetry normally dextral; occasional examples of reversed asymmetry may be found; strigil minute, of 3 combs, located at end of a stalk on extreme right of sixth abdominal segment. For details of male structures see Plate XCIV. Female abdomen normal.

Comparative notes: See key for distinguishing this form from the others.

Location of types: The type series, in part a gift from the collection of Doctor Parshley and in part purchased from the Washington University collection, is now in the Francis Huntington Snow Collections, University of Kansas. Since the holotype, taken at Piney Branch, District of Columbia, is missing, a lectotype has been set up, bearing the label "Plummer's Island, Md., H. S. Barber, coll."; allotype female and 1 female paratype, Piney Branch, District of Columbia, July 5, 1905, D. H. Clemons; 1 male and 3 females, Great Falls, Md., Nov. 12, 1905, O. Heidemann, coll.; 1 male and 4 females, Plummer's Island, Md., March 23, 1907, D. H. Clemons; 1 female, Church Bridge, Va., Aug. 30, 1906, D. H. Clemons.

Data on distribution: (Plate XCVII.) Besides the types we have examined the following material:

U. S. A.: *New Hampshire:* Hampton, April 10, 1931, S. A. Shaw, 1 female; same place and collector, April 18, 1932,. 1 female; same place and collector, May 3, 1931, 2 females.

Massachusetts: Uhler Coll., 1 female; Lynn, July, 1901, Davis (Parshley), 3 females; Malden, June 1, 1895, F. H. Sprague, 1 male.

Connecticut: New Haven, April 18, 1911, B. H. Walden, 3 females; same place, Aug. 23, 1934, P. McKinstry, 2 males, 5 females; Litchfield, July 28, 1915, L. B. Woodruff, 2 males, 1 female; Suffield, May 12, 1903, F. Knabb, 1 female; Cheshire, May 6, 1911, B. H. Walden, 1 male; New Haven, Aug. 25, 1934, P. McKinstry, 1 female.

New York: Lancaster, E. P. Van Duzee, 1 female; New Rochelle, Aug. 3, 1920, 1 male; Ithaca, Aug., 1922, 1 male; same place, Sept. 5, 1922 (Cornell), 1 female; same place, Aug. 30, 1922 (Cornell), 1 female; same place, July 12, 1920 (Cornell), 1 male, 1 female; same place, July 11, 1917, H. B. Hungerford, 2 males, 4 females; same place, March 26, 1913 (Parshley), 1 male; same place, P. W. Claassen, 1 male, 2 females; same place, April, 1915, 1 female; Putnam Co., 1903 (Bueno Coll.), 5 males, 5 females; same place, Sept. 5, 1903, 1 male, 4 females; Buffalo, E. P. Van Duzee (Uhler Coll.), 1 male, 1 female; W. Shokan, July 30, 1909 (Am. Mus. Nat. Hist.), 4 males, 4 females; Mosholu, April 24, 1906 (Wash. U. Coll.), 1 male, 2 females; White Plains, June, 1908 (Wash. U. Coll.), 2 females; Nepperham, Sept., 1905 (Wash. U. Coll.) 1 male, 4 females; Van Cortlandt Park, April 18, 1903, 1 female; Batavia, July 8, 1913, H. H. Knight, 1 male, 1 female; Westport (Uhler Coll.), 1 female; New York, June 29, 1904 (Am. Mus. Nat. Hist.), 1 male, 1 female; Yaphank, Long Island, 1 female.

Pennsylvania: Arendtsville, July 12, 1931, S. W. Frost, 1 male, 5 females; August (Uhler Coll.), 2 males, 5 females; Newtown, Stonybrook, May 16, 1925, L. B. Woodruff, 1 female; Rockville, April 1, 1919, J. G. Sanders, 1 male, 2 females; Highspire, Sept., 1925, 3 males, 3 females; Shawville, April 23, 1941, John Bauer (Carnegie), 2 males; Newton Square, July 1, 1941, J. C. Lutz (Lutz Coll.), 23 males, 28 females; Quakertown, Nov. 22, 1917, H. W. Fowler, 2 males; Overbrook (Phil. Acad. Sci.), 2 males; State College, Oct., 1938, Singer, 1 female; same place, May 19, 1921, 1 female; same place, Nov. 21, 1938, S. W. Frost, 1 male; Lebanon Co., 2 mi. n. of Lebanon, Sept. 3, 1932, G. Kauffman (Mich.), 3 males, 4 females.

New Jersey: Cranford, Aug. 6, 1904, 1 female; Milltown, July 1917, E. L. Dickerson, 1 male, 2 females; Cassville, May 13, 1910 (Am. Mus. Nat. Hist.), 2 females; Lakehurst, April 15, 1910 (Am. Mus. Nat. Hist.), 1 female; Camden Co., 1 male, 2 females; Michtville, S. T. Kemp, 3 males; Patterson, April 1923, 1 male.

Maryland: Plummer's Island, July 27, 1913, W. L. McAtee (U. S. N. M.), 3 males, 6 females; Odenton, July 4, 1913, W. L. McAtee (U. S. N. M.), 2 males, 2 females; Plummer's Island, July 15, 1903, W. V. Warner, 1 female; Cabin John, Aug. 5, 1944, R. I. Sailer (U. S. N. M.), 31 males, 31 females; Beltsville, Sept. 25, 1932, P. W. Oman, 23 males, 44 females; Annapolis, summer, 1932, P. W. Oman, 6 males, 14 females; Glen Echo, 1892, O. Heidemann (Cornell), 2 males, 2 females; Myersville, May 23, 1911, 3 males; Maryland (Uhler Coll.), 3 males, 4 females.

District of Columbia: Piney Brook, Sept. 26 (Uhler Coll.), 2 males, 4 females; Washington, Sept. 2, 1932, P. W. Oman, 12 males, 29 females; same place, May 7, 1905, D. H. Clemons, 2 males; same place (Cornell), 25 males, 56 females.

West Virginia: Morgantown, Aug., 1923, 1 female; Parsons, July, 1924, 1 female; Turkey Co., July 26, 1928, 1 female; Preston Co., July 28, 1928, 1 male.

Virginia: National Bridge, Aug. 22, 1918, A. N. Caudell, 4 females; Warrenton, May 15, 1923, L. C. Woodruff, 7 males, 6 females; Page Co., April 14, 1940, J. P. E. Morrison (U. S. N. M.), 3 males, 1 female; Bluemont, Aug. 31, 1913, W. L. McAtee (U. S. N. M.), 1 male; Paris, July, 1898 (Cornell), 3 males, 3 females; Springvale, 1897 (Uhler), 4 females; Virginia (Ill. Nat. Hist. Surv.), 1 female; Virginia (Cornell), 4 females.

Tennessee: Clarksville, July 2, 1939, J. D. Beamer, 3 males, 2 females; Chattanooga, April 4, 1922, T. H. Hubbell (Mich. Coll.), 1 male; Cumberland Co., grassy cove, July 10, 1922, T. H. Hubbell (Mich.), 4 males, 8 females; Carter Co., Roan Mt., Aug. 11, 1925, T. H. Hubbell (Mich.), 1 female.

Ohio: Rockbridge, 1916, C. J. Drake (Drake), 3 females; Hocking Co., 1916, C. J. Drake (Drake), 1 male, 2 females; Columbus, 1916, C. J. Drake (Drake), 4 males, 8 females; Portsmouth, Aug. 27, 1915, C. J. Drake (Drake), 1 female; Delaware, June 26, 1915,

C. J. Drake (Drake), 3 females; Berea, July 17, 1914, C. J. Drake (Drake), 1 female; Tiffin, July 16, 1916, C. J. Drake (Drake), 2 females.

Michigan: Druid Hill (Uhler Coll.), 1 male, 3 females; Huron Co., Pigeon River, July 3, 1922, R. F. Hussey (Mich.), 1 male, 2 females; Berrien Co., Sawyer Dunes, Aug. 31, 1919, R. F. Hussey (Hussey), 1 male; Washtenaw Co., June 17, 1919, same collector and collection, 4 males, 1 female; Ann Arbor, E. H. Forthingham (Mich.), 1 male, 1 female; Cheboygan Co., July 11, 1932, J. Leonard (Mich.), 1 male.

Indiana: Indianapolis, 8 males, 6 females; Putnam Co., Sept. 28, 1924, W. S. B. (Blatchley), 2 females.

Illinois: Oakwood, July 1, 1932, W. V. B., 2 males, 2 females; Champaign, May 6, 1928, A. T. McClay, 1 male, 1 female; Havana, Illinois R. (Ill. Univ.), 4 males, 4 females; same place, Sept. 21, 1894, Hart and Newberry (Ill. Nat. Hist. Surv.), 2 females; Gorham, Aug. 8, 1932, W. J. Gerhard (Field Mus.), 1 male, 10 females; Muncie, July 24, 1909 (Ill. Nat. Hist. Surv.), 1 male, 2 females; Urbana, Oct. 28, 1907 (Ill. Nat. Hist. Surv.), 5 males, 2 females

Minnesota: H. B. Hungerford, 3 females.

Missouri: St. Louis, June, 1911, J. F. Abbott (Abbott), 5 males; same place, May, L. Schoelch, 1 female; Columbus, April 6, 1946, W. S. Craig (Mo. Coll.), 1 male.

Arkansas: Scott Co., Aug. 23, 1938, R. H. Beamer, 1 male; Marion Co., July, J. C. Bridwell, 1 female.

Mississippi: Agricultural College (Miss. Coll.), 4 males, 3 females; Iuka, July 14, 1930, P. W. Oman, 1 male; Smithville, July 15, 1930, P. W. Oman, 1 male, 3 females.

Louisiana: Slidell (Hussey Coll.), 1 female.

Texas: Kerrville, April 12, 1907, F. C. Pratt, 6 males, 12 females; same place, Guinan Creek, July 2, 1938, Ira Norris (Mich.), 1 female; Ketchum, Sept. 11, 1932, L. D. Tuthill, 1 female.

Oklahoma: Comanche Co., National Forest, June 11, 1926, T. H. Hubbell (Mich.), 4 females.

Kansas: Douglas Co., 900 ft., F. H. Snow, 1 female; Kansas (Uhler Coll.), 1 female; Lawrence, July, 1935, L. S. Henderson, 1 female; Franklin Co., Nov. 15, 1924, H. K. Gloyd, 1 female; Riley Co., from student collection, 1 female; Cowley Co., Feb. 23, 1921, W. E. Hoffmann, 2 males, 8 females; same place, March 16, 1921,

W. E. Hoffmann, 1 female; same place and collector, April 24, 1921, 2 males, 6 females.

Nebraska: Lincoln, June 28, 1912, R. W. Dawson (Neb.), 3 males, 4 females; Pine Ridge, July (Neb.), 1 male; Lincoln, Oct. 1, 1898, Hart (Ill. Nat. Hist. Surv.), 1 male.

Colorado: Fort Collins, Aug. 22, 1931, L. D. Anderson, 1 male, 3 females.

INSULAR AMERICA: *Porto Rico:* Toa-Baja, 1915, G. Garb (Cornell), 1 male.

Sigara (Vermicorixa) virginiensis n. sp.

(Plate XCIV, figs. 9, 15, 24, and 26)

Size: Length 4.2 mm. to 5.7 mm. Width of head 1.5 mm. to 1.8 mm.

Color: General facies very like that of *S. modesta* (Abbott). Some tendency for pattern to be etched away at inner basal angle of clavus. Pronotum crossed by 7 to 8 rather narrow, irregular dark bands. Pattern of clavus and corium irregularly transverse. Head, limbs, and venter pale. Basal segments of male abdomen usually dark.

Structural characteristics: Head about half the length of the pronotal disk; vertex slightly produced in both sexes; interocular space narrower than the width of an eye; postocular space narrow; male fovea shallow and narrow, not attaining eyes laterally; antennae: 1 : 2 : 3 : 4 :: 18 : 20 : 35 : 25 ♂ ; 1 : 2 : 3 : 4 :: 20 : 20 : 38 : 25 ♀ . Pronotal disk of male usually somewhat reduced laterally, that of female normal; disk with lateral margins slightly rounded, at least not angulate; pronotum and hemelytra moderately rastrate. Postnodal pruinose area shorter than that of the claval suture in both sexes. Lateral lobe of the prothorax elongate, sides nearly parallel, apex bluntly rounded. Mesoepimeron at level of the scent gland osteole broader than the lateral lobe of the prothorax and broader than the length of the last antennal segment; osteole nearer to the tip than to the lateral bend of the mesoepimeron. Metaxyphus broader than long, the apex blunt. Front leg of female of usual shape, the pala with about 20 lower palmar hairs. Front leg of male: pala with about 30 pegs in the peg row (for details see Plate XCIV, fig. 9); tibia about two-thirds as long as pala, with a slight dorsal carina and a narrow pad; femur slender, sides parallel, without a stridular area. Middle and hind legs slender; hind femur with 4 to 6 spines on dorsal surface; proportions of segments as follows (average of 3 males and 3 females): Middle leg: femur : tibia : tarsus : claw :: 100 : 45.2 : 27.3 : 42. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 86.6 : 119.8 : 46.6. Male asymmetry dextral; strigil moderately large, of five regular combs. For pictures of abdomen and genitalia see Plate XCIV, figs. 15, 24, and 26. Female abdomen normal.

Comparative notes: This species closely resembles *Sigara modesta* (Abbott) in color pattern and in structural characteristics, but may be distinguished from the latter by having the mesoepimeron narrow with the osteole nearer its tip, and by having a large strigil in the male.

Location of types: Holotype male, allotype female, and 57 male and 52 female paratypes labeled "New Church, Va., July 15, 1934, L. D. Anderson" in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate XCVII.) Besides the type series we have the following records:

New Hampshire: Durham, Oct. 20, 1901, 1 male.

New Jersey: College Farm, Aug., 1919 (Hussey), 1 male.

Pennsylvania: Shawville, April 23, 1941, John Bauer (Carnegie), 2 males; Philadelphia, 1926, F. Anderson, 6 males, 5 females; same place, May 30, 1928, J. C. Lutz, 7 males, 1 female; same place and collector, May 7, 1928, 1 male, 1 female; Narberth, Dec. 19, 1922, Wm. E. Hoffmann (Phila. Acad. Sci.), 1 male, 1 female.

Ohio: Cuyahoga Co., July 16, 1914, C. J. Drake (Drake), 4 males, 4 females.

Maryland: Annapolis, on U. S. 50, Sept. 18, 1932, P. W. Oman, 1 male.

District of Columbia: Washington (Uhler), 1 female; Washington (Cornell), 2 males, 5 females.

Virginia: Warrenton, May 15, 1928, L. C. Woodruff, 1 male, 3 females.

West Virginia: Aurora, Aug. 14, 1904, O. Heidemann (Cornell), 1 female.

North Carolina: Raleigh, Oct. 11, 1915, R. W. Leiby, 1 female; Swananoa, Oct. 5, 1915, same collector, 2 males, 6 females; Southern Pines, March 27, 1905, G. M. Bentley, 1 female; Valley of Black Mountains, Aug. 14, 1906, W. Beutenmuller, 1 male, 1 female; same place and collector, Sept. 15, 1906, 1 male, 1 female; Raleigh, early August, 1900, F. Sherman, 1 female; same place and collector, March 28, 1901, 1 female; same place and collector, Jan. 22, 1904, 1 male.

South Carolina: (Uhler) 2 males.

Georgia: Gainesville, April 2, 1911 (Cornell), 1 male, 1 female.

Tennessee: Fentress Co., Allardt, Aug. 19, 1922, T. H. Hubbell (Mich.), 1 male.

Texas: Wood Co., Feb. 5, 1939, D. Millspaugh, 1 male, 2 females; Colorado Co., March 30, 1922, Mrs. Grace Wiley, 2 females; same place and collector, April 7, 1922, 1 female.

Sigara (Vermicorixa) washingtonensis n. sp.

(Plate XCIII, figs. 6, 6a and 6b, Plate XCIV, fig. 25)

Size: Length 4.7 mm. to 5.3 mm. Width across eyes 1.5 mm. to 1.7 mm.

Color: General facies medium to dark brown. Pronotum crossed by 6 to 7 dark bands, broken and irregular, middle one or two extending only across central portion of disk, some tendency for distal ones to coalesce at margins. Clavus obliquely cross-banded, dark figures irregular and forked at outer edges, some tendency for central ones to coalesce along median suture. Corium cross-banded, the dark figures somewhat forked and tending to coalesce into wavy longitudinal lines along embolar furrow and along inner apical angle of corium; dark spot at tip of embolar groove; outer apical angle of corium pale, uniting with pale line that separates corium from membrane; pattern of the latter reticulate, distal margins nearly black. Embolium pale distally, smoky at base; head and limbs pale; venter pale throughout in females, smoky at base of abdomen in males.

Structural characteristics: Head as long as or, in a few cases, slightly longer than pronotal disk as seen from above; interocular space equal to the width of an eye; vertex somewhat produced in both sexes as seen from above; face not hairy; male fovea oval, shallow, narrow; antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 10 : 35 : 20 males; 1 : 2 : 3 : 4 :: 20 : 10 : 35 : 20 females. Pronotal disk short compared to width, nearly twice as broad as long, somewhat angulate laterally and distally; pronotum and hemelytra coarsely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow slightly longer than that of claval suture. Lateral lobe of prothorax elongate, slender, tip truncate; mesoepimeron moderately broad with osteole half way to lateral bend, margin very slightly notched at lateral bend; metaxyphus about as broad as long, tip blunt. Front leg of female of usual shape. Front leg of male as in Plate XCIII, fig. 6. Middle and hind legs slender; hind femur with two or three stout spines on dorsal surface; proportions of segments as follows (ave. 8 males, 8 females):

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.1 : 31.3 : 43.4. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 82.6 : 110.3 : 49.8. Male asymmetry dextral; strigil fairly large, of 5 regular combs. For details of male structures see Plate XCIII, figs. 6a and 6b. Female abdomen normal.

Comparative notes: See key for separation of this form from the others.

Location of types: Holotype male, allotype female, 10 male and 4 female paratypes labeled "Republic, Washington, Aug. 7, 1931, L. D. Anderson"; also 48 male and 47 female paratypes labeled "Rochester, Wash., July 22, 1931, L. D. Anderson," in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XCVII.) Besides the type series we have the following records:

CANADA: *British Columbia:* L. Windemere, Sept. 18, 1928, Owen Bryant (Bryant Coll.), 3 males, 3 females; Adams Lake, July 20, 1925, K. F. Auden, 10 males, 14 females; Vernon, Aug. 4, 1931, L. D. Anderson, 204 males, 300 females; same place, Oct. 4, 1921, W. Downes, 3 males, 6 females; W. Wold, Aug. 5, 1931, L. D. Anderson, 37 males, 50 females; Oliver, Aug. 6, 1931, L. D. Anderson, 18 males, 16 females; Queznel Lake, Sept. 29, 1933, W. Benedict, 5 males, 2 females; Vernon, Sept. 26, 1919, W. Downes, 1 male.

Alberta: Crow's Nest Pass, June 27, 1930, J. H. Pepper, 2 males, 1 female.

U. S. A.: *Washington:* Yakima, July 8, 1935, E. I. Beamer, 9 males, 26 females; Cle Elum, Sept. 4, 1933, C. H. Martin, 1 male; Toppenish, July 9, 1935, R. H. Beamer, 8 males, 14 females; Mason Co., July 3, 1919, F. M. Gaige, 10 males, 42 females; Whitman Co., Nov. 27, 1926, D. J. Leffingwell, 1 female; same place, Palouse River, P. Putnam (Mich.), 5 males, 15 females; Auburn, White River, July 14, 1932, C. H. Martin, 40 males, 41 females; Naches, July 7, 1935, R. H. Beamer, Jr., 6 males, 8 females; Cle Elum, Sept. 4, 1933, C. H. Martin, 5 males, 20 females; Cliffdell, July 7, 1935, P. W. Oman (U. S. N. M.), 2 males, 5 females.

Oregon: Union, July 13, 1931, L. D. Anderson, 38 males, 78 females; Dixie, July 9, 1931, same collector, 45 males, 43 females; Portland, 1907, 2 females; Corvallis, 1 male; Harney Co., Trout Creek, July 26, 1934, C. L. Hubbs (Mich.), 1 male, 1 female; Lake Co., Warner Lake, July 30, 1934, same collector and collection, 1 female; Lake Co., Cottonwood Cr., Aug. 8, 1934, same collector and collection, 1 female; Lake Co., Quartz Cr., Aug. 9, 1934, same collector and collection, 1 female; Umatilla, July 14, 1931, M. W. Sanderson, 12 males, 10 females; same place and date, L. D. Anderson, 2 males, 4 females; Hot Lake, July 13, 1931, same collector, 4 females; North Powder, July 13, 1931, same collector, 20 males, 9 females; Haines, July 10, 1931, M. W. Sanderson, 2 females; Yoncalla, July 12, 1935, R. H. Beamer, 2 males, 4 females.

California: Walnut Creek, Aug. 9, 1929, R. L. Usinger, 2 males, 6 females; Weed, June 29, 1935, R. H. Beamer, 6 males, 14 females; (P. R. Uhler Coll.), 3 males, 1 female; St. Helena, July 1-15, 1908 (Cornell), 9 males, 38 females; Palo Alto, June 6, 1892 (Cornell), 1 female; San José, A. E. Burt (Cornell), 1 female; Victorville, August, 1915, C. H. Kennedy (Cornell), 2 females; Monticello, Putah Creek, Dec., 1917, J. C. Bradley (Cornell), 1 male; Napa Co. (Brooklyn Mus. Coll.), 2 males, 4 females; Salina River, same collection, 5 males, 5 females; Miles Canyon, Alameda Co., 1 male; Trinity Center, Trinity Co., Coffey Cr., June 26, 1931, R. L. Usinger (Usinger), 2 males.

Nevada: Reno, July 12, 1939, P. Bartsch (Nat. Mus.), 2 males, 2 females; Del Monte R., Reno, July 12, 1939, P. Bartsch (U. S.-N. M.), 1 female.

Arizona: Baboquivari Mts., July 16, 1932, R. H. Beamer, Jr., 1 female; Santa Cruz Co., June 9, 1940, M. F. Ashburn (U. S.-N. M.), 2 females.

Utah: Heber, Aug. 17, 1940, L. C. Kuitert, 4 males, 22 females; Logan, April 8, 1930, G. F. Knowlton, 4 females (Utah Exp. Sta.); same place, collector and collection, March 21, 1929, 9 males, 18 females; same place, collector and collection, Jan. 4, 1933, 1 male, 1 female; same place, Dec. 8, 1935, R. E. Nye, same collection, 1 male, 1 female; Logan Canyon, March 12, 1934, W. Thomas, 1 female, same collection; Provo Canyon, Aug. 15, 1940, L. C. Kuitert, 21 males, 35 females; Benson Wood, April 8, 1930, G. F. Knowlton (Utah Exp. Sta.), 1 female; Fish Lake, Aug. 16, 1929, L. D. Anderson, 2 males; 6 females; Weber Canyon, July 4, 1931, J. Nottingham, 1 female; Logan, Jan. 1, 1933, T. O. Thatcher (Utah Exp. Sta.), 1 male, 1 female; Logan Canyon, March 12, 1934, W. Thomas, same collection, 1 female; Logan, meadows, April 8, 1930, G. F. Knowlton, same collection, 1 female; Logan, Dec. 8, 1935, R. E. Nye, same collection, 1 male, 2 females; same place and collection, March 21, 1930, G. F. Knowlton, 1 female; same place and collection, June 3, 1935, R. E. Nye, 1 female; same place and collection, Aug. 13, 1934, F. H. Gunnell, 1 female; same place and collection, March 21, 1929, G. F. Knowlton, 9 males, 17 females; Brigham, Aug. 16, 1934, F. H. Gunnell, same collection, 4 males, 1 female.

Idaho: Bliss, July 7, 1931, L. D. Anderson, several hundred specimens; same place and date, M. W. Sanderson, 7 males, 7 females.

Montana: Whitehall, Aug. 13, 1931, L. D. Anderson, 6 males, 25 females; Drummond, Aug. 11, 1931, L. D. Anderson, 5 males, 6 females; Bennett, Aug. 12, 1931, same collector, 55 males, 45 females; Glacier Nat. Park, Aug. 20, 1926, G. Cady, 4 males, 5 females; same place, Sherborne Lake, April 13, 1932, A. S. Haggard, 1 male; Bozeman, May 15, 1927, 3 females; same place, Aug. 13, 1931, R. H. Beamer, 4 males, 13 females; Broadwater Co., L. Sewall, June 20, 1941, G. K. MacMillan (Carnegie), 1 male; Three Forks, July 22, 1931, L. D. Anderson, 1 male.

Wyoming: N. Platte, 1925, G. Cady, 2 males, 5 females; same place and collector, Sept. 2, 1926, 2 males, 2 females; Yellowstone Nat'l Pk., Aug., 1891, S. A. Forbes (Illinois), 17 males, 27 females; Boulder, Aug. 19, 1931, L. D. Anderson, 1 female; Yellowstone Park, Lower Pelecan Potomogeton, Aug. 24, 1890, S. A. Forbes (Illinois Univ.), 4 females; same place, collector and collection, Head of Flathead Lake, Aug. 2, 1891, 13 males, 59 females.

Colorado: Gould, Aug. 18, 1941, H. C. Severin, 1 female; Northgate, Aug. 20, 1931, L. D. Anderson, 2 males; Peyton, Aug. 19, 1936, R. H. Beamer, 1 female; Fruita, Aug. 15, 1936, M. B. Jackson, 1 female.

Sigara (*Vermicorixa*) *grossolineata* n. sp.

(Plate XCIII, figs 4, 4a and 4b; Plate XCIV, figs. 5, 6, 10, 11, 12)

1917. *Arctocorisa scabra*, Parshley, H. M. Occasional Papers of Boston Soc. Nat. Hist., VII, p. 119 (in part, which see).

Size: Length 4.7 mm. to 5.6 mm. Width across eyes 1.6 mm. to 1.9 mm. General shape longer and more slender than *S. modesta* (Abbott).

Color: General facies medium to dark brown. Pronotum crossed by 8 fairly regular brown bands, about as thick as pale interspaces, distal 3 or 4 tending to coalesce along margins, first 2 sometimes coalescent on either side of median carina which is generally pale. Color pattern of hemelytra, especially of clavus, variable, sometimes almost solid, especially along hemelytral suture; at other times definitely cross-banded, but always with dark pattern coalescent along median suture. Corial pattern also varying from almost solid brown to definite pattern which has mottled appearance; dark coloration has some tendency to coalesce on inner distal angle of corium, but not so definitely as in *S. modesta* (Abbott) and *S. stigmatica* (Fieb.); brown spot at apex of embolar groove; outer distal angle of corium pale. Corium separated by pale band from membrane which has reticulate pattern with distal margin solid brown. Embolium, head, and limbs pale; margins of thorax and distal portion of abdomen usually pale; postcoxal piece usually dark, base of abdomen dark.

Structural characteristics: Head about half as long as pronotal disk; interocular space less than the width of an eye; vertex slightly produced and somewhat pointed in both sexes as seen from above; face not hairy; male fovea oval, narrow, fairly shallow; antennal segmentation: 1 : 2 : 3 : 4 :: 19 : 15 : 31 : 28 ♂; 1 : 2 : 3 : 4 :: 20 : 15 : 35 : 25 ♀. Pronotal disk longer in proportion to width than in *S. modesta* (Abbt.) or in *S. stigmatica* (Fieb.); angulate laterally, somewhat rounded distally; median carina plainly visible on anterior fourth; pronotum and hemelytra coarsely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow equal to that of claval suture. Lateral lobe of prothorax elongate, sides parallel, tip rounded; mesoepimeron broad with osteole almost at lateral bend; metaxyphus broader than long, apex bluntly rounded. Front leg of female of usual shape. Front leg of male: pala broader in in proportion to length than in *S. stigmatica* (Fieb.), peg row consisting of 34 pegs; tibia about half as long as pala, with short, slight dorsal carina, and a small pad; femur slender, sides parallel, with pilose area on basal half of inner surface. Middle and hind legs slender; hind tibia with a row of short spines on dorsal surface; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 43.3 : 27 : 48.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 86 : 104.5 : 45.2. Male asymmetry dextral; strigil minute, of 3 regular combs. Male pala, abdomen and genitalia as in Plate XCIII, figs. 4, 4a, and 4b. Female abdomen normal.

Comparative notes: This species is very close to *S. stigmatica* (Fieb.) and *S. modesta* (Abbt.) but differs from the latter in that the scent gland osteole is located right at the lateral bend, and the metaxyphus is slightly broader than long.

Location of types: Holotype male, allotype female, 17 male and 16 female paratypes labeled "Carlson, Minn., Aug. 8, 1922, H. B. Hungerford"; also 29 male and 27 female paratypes, same collector, Pelican Rapids, Minn., Aug. 22, 1922, in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate XCVII.) Besides the types we have the following records:

CANADA: Canada, 1902, C. F. Baker, 4 females (U. S. N. M.), Montmor (Uhler Coll.), 1 male.

Quebec: Laval, April 6, 1937, 1 male; same place, May 28, 1938, 1 female; Montreal Island, April 26, 1903 (Bueno), 2 males, 1 female.

Ontario: Ottawa, April 16, 1927, G. S. Walley, 3 males; Thunder Bay Beach, July 9, 1941, H. S. Parish, 1 male; Toronto, March 21, 1931, E. C. Oakley, 1 male, 1 female.

Manitoba: Hartney, July 31, 1937, H. T. Peters, 7 males, 10 females; same place and date, R. H. Beamer, 1 male, 3 females; Birch River, Aug. 3, 1937, C. L. Johnston, 1 male; Red Deer River, same date, R. H. Beamer, 16 males, 17 females; Mafeking, same date and collector, 1 male; same place and date, C. L. Johnston, 1 male; Swan River, Aug. 2, 1937, R. H. Beamer, 7 male, 11 females; Russell, Aug. 1, 1937, same collector, 3 males, 10 females; same place and date, H. T. Peters, 22 males, 30 females; Bird's Hill, June 5, 1911, J. B. Wallis (Wallis Coll.), 1 male; Swan River, Aug. 2, 1937, C. L. Johnston, 3 males, 10 females.

Saskatchewan: Pelly, Aug. 2, 1937, C. L. Johnston, 15 males, 11 females; same place and date, R. H. Beamer, 4 males, 4 females.

U. S. A.: *Maine:* Orono, April 28, 1912 (H. M. P.), 1 female; Fryeburg, Aug. 20, 1934, M. E. Griffith, 11 males, 29 females.

New Hampshire: Durham, Oct. 20, 1901 (Parshley), 6 males, 14 females; Glen, Aug. 20, 1934, P. McKinstry, 2 females.

Massachusetts: Forest Hills, May 4, 1921, R. F. Hussey, 1 male, 2 females; same place and collector, Oct. 21, 1921, 5 males, 4 females; Lynn, July, 1901, Davis Coll. (Parshley), 1 male.

New York: Ithaca, Aug. 8, 1903 (Parshley), 1 male; same place, June 11, 1917, H. B. Hungerford, 1 male, 1 female; same place

(Cornell), 1 female; Westport (Uhler Coll.), 1 female; Buffalo, E. P. Van Duzee (Uhler), 1 female.

Pennsylvania: Delaware Co., July 1, 1941, J. C. Lutz (Lutz Coll.), 3 males, 4 females; Morris Park, Philadelphia, April 6, 1928, J. C. Lutz (Lutz Coll.), 1 male, 1 female; Narberth, Oct. 19, 1922, W. E. Hoffmann, 1 male.

Ohio: Summit Co., Aug. 31, 1916, C. J. Drake (Drake Coll.); 1 male, 2 females.

Michigan: Ann Arbor, July-Aug., 1921, R. F. Hussey (Hussey), 3 males, 5 females; Agricultural College (Uhler Coll.), 1 male; Lake Gogebic, Aug. 18, 1937, C. L. Johnston, 1 male, 6 females; Bois Blanc Island, Aug. 11, 1932, H. B. Hungerford, 1 male, 3 females; Douglas Lake, Aug. 25, 1925, same collector, 1 male; Cheboygan Co., Aug 2, 1937, same collector, 5 males, 9 females; same place and collector, July 20, 1931, 2 males, 3 females; Livingston Co., Lakeland, Aug. 10, 1914, R. F. Hussey (Hussey), 1 male; Berrien Co., June 4, 1920, same collector and collection, 12 males, 24 females; Huron Co., Pigeon R., July 3, 1922, R. F. Hussey (Mich.), 1 male.

Illinois: (Uhler Coll.), 2 males; Normal (Uhler Coll.), 1 male; Algonquin, Nov. 3, 1908, Nason (Ill. Nat. Hist. Surv.), 1 male, 4 females; Edge Brook, Nov. 7, 1903, V. E. Shelford (Parshley), 2 females; Havana, Sept. 21, 1894, Hart and Newberry (Ill. Nat. Hist. Surv.), 2 males, 8 females; same place and collection, Aug. 15, 1894, Hart, 1 female; same place, collector and collection, April 11, 1895, 1 male, 1 female; same place, collector and collection, March 28, 1895, 1 male; same place, collector and collection, Dec 23, 1895, 1 female; same place and collection, Nov. 14, 1895, Hempel and Kofoid, 1 male, 3 females; Homer, March 21, 1914, same collection, 1 female; Warsaw, June 26-27, 1893, same collection, 1 male, 2 females.

Iowa: Ames, July 29, 1924, C. J. Drake, 1 male, 2 females; Iowa, April 3, 1940, D. Millspaugh, 1 male, 5 females; Iowa, April 9, 1940, J. G. Little, 5 males, 6 females; Iowa, Nov., 1931, D. Millspaugh, 1 female; Iowa, May 8, 1937, same collector, 4 female; Iowa, Oct. 25, 1936, same collector, 1 male; Iowa, May 23, 1935, H. Huisings, 1 male, 1 female; Iowa, March 17, 1939, O. Halvorson, 1 female; Mt. Pleasant, April 3, 1940, Wirsig, 1 female; same place, April 5, 1940, Dougherty, 1 female; same place, April 30, 1940, Phillips, 1 female; same place, Oct. 19, 1936, M. E. Hoalzan, 1 female.

Wisconsin: Brule, Aug. 16, 1937, C. L. Johnston, 3 males, 4 females; Dane Co., March 16, 1930, E. P. Breakey, 15 males, 22 females.

Minnesota: Minneapolis, Oct. 11, 1919, R. F. Hussey (Hussey), 4 males, 5 females; Cooley, Aug. 13, 1937, C. L. Johnston, 33 males, 60 females; same place and date, H. T. Peters, 1 male, 13 females; Minnesota, H. B. Hungerford, 3 males, 12 females; Bengal, Aug. 18, 1922, same collector, 9 males, 21 females; Two Harbors, Aug. 9, 1922, same collector, 1 male; Minnehaha Cr., Hennepin Co., July 9, 1921, same collector, 1 female; Itasca Park, Aug. 21, 1922, same collector, 1 male; St. Paul, July 28, 1921, same collector, 1 female; Hibbing, Aug. 18, 1922, same collector, 1 male; Grand Marais, Aug. 13, 1922, same collector, 1 female; Beaver Dam, Aug. 12, 1922, 1 female; Rochester, July 16, 1921, 10 males, 21 females; Minneapolis, July 22, 1921, 1 male; same place, Aug. 17, 1921, W. E. Hoffman, 1 male; Bird Island, Aug. 25, 1921, same collector, 1 male, 1 female; Stephen, Aug. 10, 1937, C. L. Johnston, 1 female; Minnehaha Cr., Hennepin Co., July 24, 1921, H. B. Hungerford (Minn. Coll.), 2 males, 15 females; Lake City, June 25, 1921, W. E. Hoffmann (Minn.), 4 males, 4 females; Olmsted Co., C. N. Ainslie, 1 female; Carlson, Aug. 8, 1922, H. B. Hungerford, 2 males, 7 females.

North Dakota: Linton, July 23, 1937, C. L. Johnston, 6 males, 3 females; same place and date, H. T. Peters, 1 male, 1 female; same place and date, R. H. Beamer, 2 males, 2 females; Hillsboro, July 26, 1937, same collector, 2 males, 2 females; Leonard, same date and collector, 2 males, 3 females; Fargo, July 26, 1937, H. T. Peters, 1 male.

South Dakota: Rosebud, Sept. 15, 1940, H. C. Severin, 3 females; same place and collector, June 18, 1941, 2 males, 3 females; Hot Springs, June 22, 1940, same collector, 2 males; State Game Lodge, June, 1941, same collector, 1 male; Jordan, Sept. 5, 1940, same collector, 2 males; Rapid City, Sept. 7, 1940, same collector, 1 female; Redig, June 16, 1941, same collector, 2 females; Little White River, Sept. 14, 1940, same collector, 1 female; Piedmont, July 17, 1937, R. H. Beamer, 1 male; Houghton, July 22, 1937, same collector, 2 males, 1 female.

Nebraska: (Uhler Coll.) 1 male; Lincoln, Oct. 1, 1898, Hart (Ill. Nat. Hist. Surv.), 1 male.

Kansas: Riley Co., 1 female; Douglas Co., trap light, summer, 1930, P. B. Lawson, 1 male, 1 female; same place, H. B. Hungerford, 3 males, 2 females; same place, Rock Creek, same collector, 1 male; same place and collector, May 30, 1916, 1 male; same place and collector, Feb. 15, 1921, 1 male, 1 female; same place and collector, Feb. 23, 1921, 1 male, 1 female; same place, April 22, 1919, W. E. Hoffmann, 1 female; same place, July 29. 1919, same collector, 1 female; Medora, Sand Dunes, July 30, D. A. Wilbur, 1 female; Atchison Co., July 11, 1924, R. H. Beamer, 7 males, 11 females; Coldwater, June 19, 1927, H. B. Hungerford, 1 female; Decatur Co., 2,560 ft., F. X. Williams, 1 female; Hodgman Co., July 17-25, 1917, 2 females; Leavenworth Co., July 12, 1924, E. P. Breakey, 30 males, 20 females; same place, July 1, 1924, R. H. Beamer, 1 female; Chase Co., June 20, 1923, C. O. Bare, 1 female; Douglas Co., June 21, 1928, P. B. Lawson, 1 male, 4 females; same place, July, 1 male.

Oklahoma: Ketchum, Sept. 11, 1932, L. D. Tuthill, 1 female; Tulsa Co., March, 1922, Mrs. Grace Wiley, 2 females; Oklahoma City, May 3, 1922, same collector, 1 male, 1 female.

New Mexico: Wagonmound, July 18, 1936, M. B. Jackson, 25 males, 27 females.

Colorado: Ft. Collins, Aug. 6, 1899, 1 male; same place, Aug. 22, 1931, L. D. Anderson, 1 male, 3 females; Boulder, May 13, 1914, M. M. Ellis (Hussey), 1 male, 4 females.

Wyoming: Wheatland, July 14, 1937, R. H. Beamer, 1 male, 3 females; Converse Co., July, 1904 (Carnegie Mus. Coll.), 1 male.

Montana: Broadwater Co., L. Sewall, June 20, 1941, G. K. MacMillan (Carnegie), 3 males, 5 females.

Utah: Wellsville, Aug. 16, 1934, Gunnell (Utah Exp. Sta.), 2 males; Logan, Aug. 13, 1934, same collector and collection, 1 female; Spring Creek, R. E. Nye, same collector and collection, 1 male, 1 female.

California: Mammoth Lakes, July 20, 1940, L. C. Kuitert, 8 males, 7 females.

Sigara (Vermicorixa) mckinstryi n. sp.

(Plate XCIII, figs. 1, 1a and 1b)

Size: Length 4.6 mm. to 5.8 mm. Width across eyes 1.5 mm to 1.8 mm.

Color: General facies dark. Pronotum crossed by 6 irregular dark bands, a little narrower than pale interspaces, distal bands coalescent along lateral margins. Clavus cross-banded, the dark figures broader than pale ones, anterior ones forked, central and distal ones coalescent along median suture. Corium cross-banded, the dark figures dominant over pale ones, tending to coalesce into wavy, rather broad longitudinal lines along embolar groove and inner margin of corium; dark spot at apex of embolium; outer distal angle of corium pale, uniting with pale line which marks membranal suture. Pattern of membrane reticulate, distal margin dark brown. Embolium smoky at base, pale distally; in some specimens, pale throughout. Head and limbs pale; thoracic venter dark around coxae with sides pale; base of abdomen smoky in females to black in males, distal segments pale.

Structural characteristics: Head half to two-thirds as long as pronotal disk; interocular space narrower than the width of an eye; vertex slightly produced in both sexes as seen from above; face not hairy; male fovea oval, narrow, shallow; antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 12 : 33 : 25 ♂ ; 1 : 2 : 3 : 4 :: 20 : 10 : 35 : 25 ♀ . Pronotal disk angulate laterally and apically, median carina on anterior fourth; pronotum and hemelytra coarsely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to the nodal furrow longer than that of the claval suture. Lateral lobe of prothorax elongate, slender, tip obliquely truncate; mesoepimeron narrow with osteole near the tip, broader than length of last antennal segment at level of osteole; metaxyphus a little broader than long, apex pointed. Front leg of female of usual shape. Front leg of male as in Plate XCIII, fig. 1. Middle and hind legs slender; proportions of segment to segment as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42.5 : 30.3 : 42.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 84.7 : 107.8 : 45.4. Male asymmetry dextral; strigil small, of 4 regular combs. For details of male structures see Plate XCIII, figs. 1a and 1b. Female abdomen normal.

Comparative notes: See key for separating this species from others.

Location of types: Holotype male, allotype female, 4 male and 24 female paratypes labeled "Contra Costa Co., Calif., April 5, 1936, P. McKinstry" in the Francis Huntington Snow Entomological Collection, University of Kansas.

Data on distribution: (Plate XCVII.)

California: Niles Canyon, Alameda Co., 7 males, 7 females; Stanford U., 6 males, 15 females; Sonona Co., 1 male; Lompoc, Aug. 9, 1938, D. W. Craik, 2 males; Madrone, Santa Cruz Co., Sept. 15, 1922, G. D. Hanna (Van Duzee), 1 male, 1 female; Sonona, July 14, 1926, E. H. Nast (Van Duzee), 1 male, 1 female; St. Helena, July, J. C. Bradley (Van Duzee), 3 males, 5 females; San Mateo Co., Moss Beach, Sept. 8, 1946 (Usinger), 1 male, 2 females.

Sigara (Vermicorixa) mathesoni n. sp.

(Plate XCIII, figs. 3, 3a-3b)

1917 *Arctocorisa scabra*, Parshley, H M. Occasional Papers of Boston Soc. Nat. Hist., VII, p. 119 (in part, which see).

Size: Length 4.6 mm. to 5.3 mm. Width across eyes 1.6 mm. to 1.8 mm.

Color: General facies a little darker than the medium. Head with a median longitudinal brown stripe; pronotum crossed by 6 irregular dark bands, a little narrower than pale spaces, and none of them coalescent along margins. Clavus obliquely banded, the dark coloration tending to coalesce medially along hemelytral suture. Corial pattern coarse, irregular, light and dark coloring about equal in distribution on outer portion, dark tending to coalesce into longitudinal brown stripe near inner distal angle; brown spot at apex of embolar groove; outer distal angle of corium semihyaline. Membrane and corium separated by pale line; pattern of membrane reticulate. Embolium, head and limbs pale; abdomen pale in females, smoky at base in males.

Structural characteristics: Head four-fifths as long as pronotal disk; interocular space equal to the width of an eye; vertex slightly produced in both sexes as seen from above; face not hairy; male fovea oval, narrow, rather shallow; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 9 : 38 : 20 ♂; 1 : 2 : 3 : 4 :: 20 : 10 : 38 : 21 ♀. Pronotal disk rounded laterally, somewhat pointed distally; median carina plainly visible on anterior third; pronotum and hemelytra moderately rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow longer than that of claval suture. Lateral lobe of prothorax elongate, sides parallel, tip rounded; mesoepimeron moderately broad with osteole about two-thirds of way from tip, deep incision in mesoepimeron at lateral bend; metaxyphus a little broader than long, tip pointed. Front leg of female of usual shape. Front leg of male: pala elongate, not quite three times as long as broad, 28 pegs in a single row as in Plate XCIII, fig. 3; tibia with dorsal carina and an oblong oval pad surrounded by hairs; femur slender with inner surface pilose on basal third. Middle and hind legs slender; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.4 : 31.3 : 46.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.8 : 128.5 : 53.6. Male asymmetry dextral; strigil large, suboval, of seven regular combs; tip of male right clasper hooked. For details of male structures see Plate XCIII, figs. 3, 3a, and 3b. Female abdomen normal.

Comparative notes: Although closely related to *S. stigmatica* (Fieb.), this species may readily be distinguished from the latter in having the mesoepimeron notched, and in having the pruinose area of the claval suture shorter than that of the postnodal pruinose area.

Location of types: Holotype male and allotype female, labeled "Truro, Nova Scotia, Can., Aug. 5, 1913, R. Matheson"; 1 male paratype labeled "Redberry L., Saskatchewan, Can., Sept. 21, 1940, via D. S. Rawson"; and 6 male and 3 female paratypes labeled "Cheboygan, Mich., Aug. 18, 1931, H. B. Hungerford" in the Francis Huntington Snow Collections, University of Kansas. In the Cornell Collections, Ithaca, New York, 1 male and 5 female paratypes bearing same data as the holotype and allotype.

Data on distribution: (Plate XCVII.) Besides the type series we have the following records:

CANADA: *Manitoba:* July 13, 1917, J. B. Wallis, 1 female (Wallis Coll.).

U. S. A.: *Connecticut:* Cornwall, June 26, 1924, L. B. Woodruff (A. M. N. H.), 1 female.

New York: Ithaca, June 11, 1917, H. B. Hungerford, 1 male; Cedar R., July 6, 1934, M. W. Sanderson, 2 males, 1 female.

New Jersey: Jamesburgh, Hussey, 3 females; New Brunswick, Hussey, 1 female.

Pennsylvania: Wyomissing, Aug. 27, 1934, R. P. Seibert, 2 males, 2 females; Bethlehem, May 14, 1912, H. W. Fowler, 1 female; State College, Nov. 21, 1938, S. W. Frost, 1 male, 3 females; same place, 1917, 3 males, 5 females; August (Uhler), 2 females.

Michigan: Fond du Lac Co., Grand R., Fairwater, Aug. 28, 1925, Creaser and Jones (Mich.), 10 females; Au Sable R., Roscommon, Aug. 16, 1929, T. L. Hankinson (Mich.), 1 female.

Wisconsin: Brule, Aug. 16, 1937, C. L. Johnston, 14 males, 13 females; Dane Co., April 19, 1930, E. P. Breakey, 3 males, 2 females; Madison, 1 male, 3 females (male to Europe, 1928); Sauk Co., Baraboo R., Aug. 31, 1927, Creaser, Stewart and Griffith (Mich.), 1 female.

Minnesota: Minneapolis, Mississippi River, May 4, 1920, R. F. Hussey (Hussey), 1 male.

Sigara (Vermicorixa) vandykei n. sp.

(Plate XCIII, figs. 5, 5a-5b)

Size: Length 4.3 mm. to 4.6 mm. Width across eyes 1.5 mm. to 1.6 mm. General shape rather short and compact.

Color: General facies medium brown. Pronotum crossed by 7 to 8 dark bands, equal in thickness to pale spaces, and tending to be broken, little tendency to merge on margins. Clavus boldly cross-barred, the dark and light coloration about equally distributed, central dark bands tending to coalesce along median suture. Corial pattern transverse with dark coloration tending to coalesce into a wavy longitudinal line next to embolar groove; pruinose area beyond nodal furrow bordered by black which extends almost to membranal suture; outer distal angle of corium and membranal suture pale; pattern of membrane reticulate, distal border dark. Embolium, head, limbs and venter of thorax pale; abdominal venter dark at base in both sexes.

Structural characteristics: Head half as long as pronotal disk; interocular space equal to the width of an eye; vertex slightly produced in both sexes; face not hairy; male fovea narrow, oval, rather shallow; antennae: 1 : 2 : 3 : 4 :: 15 : 12 : 32 : 25 ♂ ; 1 : 2 : 3 : 4 :: 15 : 12 : 35 : 25 ♀ . Pronotal disk with lateral angles acute, rounded distally, median carina visible on anterior fourth; pronotum and hemelytra coarsely rastrate, the latter with scattered pale hairs; antero-lateral third of clavus ridged and projecting over the pruinose area of the claval suture; pruinose area of basal angle of corium extending as far caudad as apical portion of that of the claval suture; pruinose area of the embolar groove posterior to the nodal furrow about equal to that of the claval suture. Lateral lobe of the prothorax elongate, apex rounded; mesoepimeron narrow with osteole near tip, shallow notch in margin at lateral bend; metaepisternum with uneven surface; metaxyphus a little broader than long, apex pointed. Front leg of female of usual shape. Front leg of male: pala somewhat excavated below peg row, peg row of 30 pegs, 16 of which are double (8 pairs) as in fig. 5, Plate XCIII; upper palmar row of bristles interrupted distally with about 8 bristles set above rest of row; tibia about half as long as pala, with a short dorsal carina and a small pad; femur slender, with a patch of rather long hairs on inner surface. Middle and hind legs slender; proportions of segments as follows (ave.):

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.1 : 31.7 : 46.8; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88 : 108.3 : 45.8. Male asymmetry dextral; strigil small, of 4 regular combs. For details of male structures see Plate XCIII, figs. 5, 5a, and 5b. Female abdomen with median lobe of eighth ventral abdominal segment narrow and long, and with anal lobes proportionately shortened.

Comparative notes: This species can be separated from other corixids in having the antero-lateral third of the clavus ridged and projecting over the pruinose area of the claval suture, and in having the surface of the metaepisternum uneven.

Location of types: Holotype male and allotype female labeled "Mouth of Van Duzen R., Calif., July 26, 1938; presented by E. C. Van Dyke" in the collection of the California Academy of Science. 1 male and 1 female paratype, bearing same data as above, and 7 males and 7 females paratypes labeled "Kalama River, Washington, July 21, 1931, L. D. Anderson" in the Francis Huntington Snow Collections, Lawrence, Kansas.

Data on distribution: (Plate XCVII.) Known only by the type series.

Sigara (Vermicorixa) solensis (Hungerford)

(Plate XCV, figs. 3, 3a and 3b)

1926 *Arctocorixa solensis* Hungerford, H. B. Bull Brooklyn Ent Soc, XXI, p 198, Pl XIII, figs. 4 and 13.

1936. *Arctocorixa solensis*, Walley, G S Can. Ent., Vol LXVIII, No 3, p 60 (records Ontario).

1944. *Arctocorixa solensis*, Rawson, D. S, and Moore, J. E Jl. of Res, Vol XXII· 141-201, p. 182

Size: Length 5.46 mm. to 5.9 mm. Width across eyes 1.67 mm. to 1.7 mm.

Color: General facies medium to dark brown, tinged with red. Pronotum crossed by 7 or 8 dark bands which are equal in thickness to the pale interspaces. Clavus cross-banded basally; distally, the dark areas coalesce along median margin. Corium may be almost solid brown with wavy transverse pale lines scattered here and there or the pale figures may be nearly as wide as the dark ones. Outer apical angles of corium pale, uniting with pale line separating corium and membrane. Pattern of membrane reticulate, with dark color dominating. Distal half of embolium and portion lying above medial vein pale, rest may be smoky. Head, limbs, and thorax pale. Abdomen pale in females, smoky in males.

Structural characteristics: Head more than one-half as long as pronotal disk; interocular space about equal to the width of an eye; vertex slightly produced in both sexes as seen from above; face somewhat hairy; male fovea oval, rather shallow and narrow, not attaining eyes laterally; segmentation of antennae: 1 : 2 : 3 : 4 :: 20 : 14 : 33 : 20 ♂; 1 : 2 : 3 : 4 :: 20 : 14 : 35 : 20 ♀. Pronotal disk rounded laterally and apically, with median carina visible on anterior fourth; pronotum and hemelytra finely rastrate, the latter with occasional pale hairs; pruinose area of the embolar groove posterior to nodal furrow a little longer than that of claval suture. Lateral lobe of prothorax elongate, slender, sides parallel, tip rounded; mesoepimeron broad with osteole half way to lateral bend; thoracic region slightly inflated; metaxyphus a little longer than broad, triangular, tip pointed. Front leg of female of usual shape, with 19 or 20 lower palmar hairs on pala. Front leg of male: pala not carinate on dorsal margin, trapezoidal in shape, peg row lying midway between dorsal and ventral margins and consisting of 25 to 28 pegs; upper palmar row of bristles interrupted toward apex and two stouter bristles inserted near claw; tibia about two-thirds as long as pala with a short dorsal carina and an oval pad; femur slender with about 5 rows of stridulatory pegs on inner surface, surrounded by a pilose area. Middle and hind legs slender; hind femur with two or three spines on dorsal surface; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.5 : 30.9 : 34.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 75.8 : 95.8 : 48.6. Male asymmetry dextral; strigil small, oval, of 5 regular combs. For details of male structures see Plate XCV, figs. 3, 3a and 3b. Female abdomen normal.

Comparative notes: Although this species runs out in the key in the same couplet with *S. signata* (Fieb.) they are not closely related as may be seen by a comparison of the male genitalia. The females of *solensis* lack the dorso-apical depression of the pala characteristic of most of the *signata* group.

Location of types: Described from 24 specimens labeled "Douglas L., Mich., Sedge Point Pool, Aug. 15, 1923, H. B. Hungerford." Holotype, allotype and paratypes in the Francis Huntington Snow Entomological Collection, University of Kansas.

Data on distribution: (Plate XCIX.)

CANADA: *Manitoba:* Winnipeg, May 10, 1911, J. B. Wallis (Wallis Coll.), 1 male; Cowan, Aug. 7, 1937, H. T. Peters, 1 male, 1 female; Mafeking, Aug. 3, 1937, C. L. Johnston, 2 females.

Saskatchewan: Southern Saskatchewan, May 18, 1939, J. E. Moore, 3 males, 1 female; Sept. 13, 1940, J. C. Stevenson, 1 male, 2 females.

British Columbia: Nulki Lake, July 5, 1944, J. A. Munro, 1 female; 16-Mile Lake, Aug. 30, 1944, same collector, 1 male; Seymour Lake, July 12, 1944, same collector, 2 female nymphs.

U. S. A.: *Maine:* Fryeburg, Aug. 20, 1934, M. E. Griffith, 3 females; Paris, July 4, 1915, C. A. Frost, 1 male.

New Hampshire: Bath, Aug. 21, 1934, Beamer and McKinstry, 4 males, 7 females.

Connecticut: Nachong, July 19, 1942, G. E. Pickford (Hutchinson Coll.).

New York: Ithaca, Field Station, July 17, 1917, H. B. Hungerford, 1 male, 1 female.

Michigan: Douglas Lake, Sedge Pool, Aug. 15, 1925, H. B. Hungerford, 9 males, 12 females; same place and collector, July 10, 1927, 9 females; same place and collector, Aug. 15, 1923, 1 male; Bois Blanc Island, Aug. 14, 1932, same collector, 1 male.

Wisconsin: Dane Co., March 16, 1920, E. P. Breakey, 24 males, 23 females.

Minnesota: St. Paul, July 16, 1932, A. A. Granovsky, 1 female; same place, Phalen Lake, June 19, 1921, H. B. Hungerford, 2 males, 2 females; same place and collector, Golf Pond, July 14, 1921, 1 female; same place, July 6, 1921, W. E. Hoffmann, 2 males (Minn.); same place, June 4, 1934, A. A. Granovsky, 3 males, 6 females; same place and collector, June 25, 1934, 2 males, 11 females; same place and collector, June 29, 1931, 12 males, 14 females; same place and collector, July-Sept., 1934, 10 males, 15 females; same place and collector, July 14, 1926, 6 males, 9 females; Faribault, June 14, 1934, same collector, 5 males, 8 females; Pelican Rapids, July 22, 1922, H. B. Hungerford, 1 male, 2 females; Hibbing, Aug. 16, 1922, same collector, 1 male, 1 female; Hennepin Co., Ft. Snelling, Sept. 20, 1921, W. E. Hoffmann, 5 males, 5 females; Minneapolis, April 6, 1922, same collector, 1 male; North Branch, June 17, 1922, C. E. Mickel, 2 females; Rochester, July 16, 1921, H. B. Hungerford, 2 males; Olivia, at light, June 28, 1921, H. H. Knight (Minn.), 42 males, 42 females; St. Anthony Pk., Sept. 8, 1921, same collector and collection, 3 males, 3 females; June 18, 1921, W. E. Hoffmann (Minn.), 2 males, 3 females; Ramsey Co., Snail Lake, June 19, 1921, same collector and collection, 1 female; Minnetonka L., July 15, 1921, H. H. Knight (Minn.), 2 females.

South Dakota: Weta, July 18, 1937, R. H. Beamer, 6 males, 3 females; Brookings, July 21, 1920, H. C. Severin, 1 female.

North Dakota: Fargo, July 26, 1937, C. L. Johnston, 1 female.

Sigara (Vermicorixa) transfigurata (Walley)

(Plate XCV, figs. 4, 4a and 4b)

1930 *Arctocorixa transfigurata* Walley, G. S. Can. Ent., LXII, No. 12, pp. 282, 285, Pl. XXI, figs. 2a-2d.

Size: Length 5.4 mm. to 5.9 mm. Width across eyes 1.7 mm. to 1.8 mm.

Color: General facies medium brown with bold transverse pattern to solid black; in the University of Kansas collections we have paratypes from Ottawa, Canada, which are medium brown with cross bands of light and dark; also specimens from northern Michigan which agree in color pattern with the paratypes. However, there is one male specimen from Hartsville, Mass., in which the pronotum and hemelytra are solid black except for the typical pale stripe down the center of the pronotum, and pale borders along the margins of the hemelytra and the claval suture. In the medium brown specimens, the pronotum is crossed by 4 to 5 brown bands, interrupted down the center by a pale stripe; clavus and corium boldly cross-banded with dark, impressed bands, broader than pale ones; pattern of corium continuous with that of basal portion of membrane, distal portion with dark and pale areas arranged longitudinally. Embolium slightly smoky; head, limbs and venter of lighter specimens pale; venter of dark specimen smoky on abdomen.

Structural characteristics: Since the forms which we have are all brachypterous (hind wings reduced), the head is about twice as long as the pronotal disk; however, forms with fully developed flight wings may exist, so this may not be a dependable character. Interocular space slightly narrower than the width of an eye; vertex considerably produced in both sexes as seen from above; face somewhat hairy; male face flattened only; antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 14 : 40 : 16 ♂; 1 : 2 : 3 : 4 :: 18 : 14 : 38 : 16 ♀. Pronotal disk very short, flight wings reduced; disk pointed laterally, rounded distally; median carina barely visible on anterior fourth; pronotum and hemelytra very heavily rastrate having a pebbled appearance; hemelytra with long hairs on distal portion of corium and on membrane; pruinose area of the embolar groove posterior to the nodal furrow twice as long as that of the claval suture. Lateral lobe of the prothorax elongate, sides parallel, tip obliquely truncate; base of mesoepimeron inflated, almost concealing the lateral lobe of the prothorax, broad distally, with osteole almost at the lateral bend; pleural region inflated; metaxyphus considerably broader than long, tip forming more than a right angle Front leg of female of usual shape. Front leg of male: pala trapezoidal, dorsal margin carinate near base, 24 pegs in a single row, arranged as in Plate XCV, fig. 4b; outside of pala longitudinally carinate; tibia half as long as pala, with dorsal carina and no pad; femur slender without stridulatory pegs; coxa with distinct tumescence. Middle and hind legs slender; hind femur with triple row of spines on dorsal surface; hind tibia with row of short spines down length of dorsal surface; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42.9 : 28.6 : 42.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 75 : 107.5 : 42.5. Male asymmetry dextral; strigil elongate, of 5 regular combs. For details of male structures see Plate XCV, figs. 4, 4a and 4b. Female abdomen normal.

Comparative notes: Although the dorsal armature of the hind femur and the inflated thoracic region of this species is similar to the conditions found in *Hesperocorixa brimleyi* Kirkaldy, *S. transfigurata* lacks the hair tuft at the apex of the front tibia of the male, and the genitalia of the male are unlike that of *Hesperocorixa* species. The broad mesoepimeron with the osteole at the lateral bend plus the boldly cross-barred pattern sets it aside from the other members of the *solensis* group.

Location of types: Holotype male, No. 3127, allotype female, labeled Knowlton, Que., July 8, 1929, G. S. Walley; 5 male and 21 female paratypes, same place, July 6-8, 1929, Walley; 1 male, 4 females, Ottawa, Ont., April 16, 1927, Walley; 1 female, Fairy Lake, Que., May 14, 1927, Walley. The above specimens are in the Canadian National Collection, Ottawa, Canada.

Data on distribution: (Plate XCIX.) We have the following:

CANADA: *Ontario:* Ottawa, April 16, 1927, G. S. Walley, 1 male, 1 female (paratypes).

U. S. A.: *Michigan:* Cheboygan Co., Aug. 7, 1933, H. B. Hungerford, 1 male, 3 females.

Massachusetts: Hartsville, Lake Buel, Aug. 13, 1930, J. R. de la Torre-Bueno (Bueno Coll.), 1 male.

Sigara (Vermicorixa) mullettensis (Hungerford)

(XCV, figs. 2, 2a and 2b)

1928. *Arctocorixa mullettensis* Hungerford, H. B. Can Ent. LX, p 230, figs. 10-11.

1930. *Arctocorixa impersonata* Walley, G. S. Bull. Brooklyn Ent. Soc., Vol. XXV, No. 4, pp 204-205, Pl. XI, figs. 1-5. (Desc. from Quebec, Ontario, Me., N. Y.)

1936. *Arctocorixa mullettensis*, Walley, G. S. Can. Ent., LXVIII, p. 60 (*A. impersonata* Walley a syn.).

Size: Length 5.3 mm. to 5.9 mm. Width of head across eyes 1.6 mm. to 1.85 mm.

Color: General facies dark, reddish brown. Pronotum crossed by 6 or rarely 7 broad, dark bands, equal in width to slightly broader than pale ones. Elsewhere, the dark coloring predominates; pale figures at base of clavus transverse, usually narrower than dark interspaces except at inner ends; elsewhere slender, transverse, broken or wavy. Pale figures of corium very small and arranged into three longitudinal rows; corium separated by pale line from membrane which is dark with reduced pale figures more or less arranged in longitudinal rows. Embolium, head and limbs pale; venter pale to smoky, almost black in some specimens.

Structural characteristics: Head about two-thirds as long as pronotal disk; postocular space broadest at inner angle of eyes; rear margins of eyes nearly straight; interocular space narrower than width of an eye; vertex projecting beyond eye margins, as seen from above, in both sexes; face not hairy; male fovea fairly broad but shallow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 16 : 40 : 28 ♂; 1 : 2 : 3 : 4 :: 20 : 15 : 42 : 28 ♀. Pronotal disk with lateral margins rounded; faint median carina on anterior fourth; disk somewhat pointed apically as in *trilineata* (Prov.) or more rounded; pronotum and hemelytra moderately rastrate, the latter with scattered pale hairs on corium and membrane; embolium not broad; pruinose area posterior to nodal furrow slightly longer than that of the claval suture. Lateral lobe of prothorax elongate, constricted at base, rounded at tip; thoracic region inflated as seen from dorsal view, mesoepimeron moderately broad with osteole about one-third of way between tip and lateral bend; metaxyphus small, broader than long, apex bluntly pointed. Front leg of female with pala depressed dorsally with about 20 hairs in lower palmar row. Front leg of male: pala short and fairly broad, not carinate on dorsal margin; peg row interrupted apically, with 15 to 17 pegs in basal portion and 5 to 6 in apical portion which lies along dorsal margin; outside with a low faint longitudinal ridge on basal half; tibia two-thirds as long as pala with a slight carina and a large, oval pad; femur slender with pilose area on inner surface; trochanter with a low pilose tumescence. Middle and hind legs slender; hind femur with 2 or 3 rows of spines dorsally; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.1 : 26.7 : 45.1. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 77.8 : 111.2 : 41.7. Male asymmetry dextral; strigil minute, transverse of 3 or 4 regular combs; median lobe of seventh abdominal segment angulate; left anal lobe with fringe of long hairs just below median lobe of seventh segment. For details of male structures see Plate XCV, figs. 2, 2a and 2b. Anal lobes of female abdomen not notched on inner ventral margin.

Comparative notes: Mr. Walley compared this species with what he called *Arctocorixa lineata* (Forst.) which is *S. trilineata* (Prov.). The shorter metaxyphus and the basally constricted prothoracic lobe separates this species from that of Provancher.

Location of types: Described from 24 specimens taken in Nigger Creek near Mullett Lake, Michigan, in July and August, 1925, by H. B. Hungerford. Holotype, allotype and paratypes in the Francis Huntington Snow Entomological Collection, University of Kansas. The holotype, allotype and paratypes of *A. impersonata* Walley are in the Canadian National Museum, Ottawa, Canada. Also in the collection of J. R. de la Torre-Bueno. Described from material taken in Quebec and Ontario, Canada; Maine and New York in U. S. A.

Data on distribution: (Plate XCIX.) The published records are those listed above. We have studied the following:

CANADA: *Manitoba:* Cowan, Aug. 7, 1937, H. T. Peters, 1 male; Winnipeg, May 20, 1911, J. B. Wallis (Wallis), 1 female.

British Columbia: Chief Lake, July 7, 1944, J. A. Munro, 1 female.

U. S. A.: *Maine:* Orono, May 10, 1913, H. M. Parshley (Parshley); Paris, July 4, 1915, C. A. Frost (Parshley); Fryeburg, Aug. 20, 1934, M. E. Griffith, 1 female.

New Hampshire: Bath, Aug. 21, 1934, P. McKinstry, 8 females;

Hampton, May 22, 1921, Albert Shaw, 1 female; Durham, Sept. 20, 1901 (Parshley).

Rhode Island: Kingston, May 3, 1908 (Parshley).

Connecticut: Windham Co. (Brooklyn Mus. Coll.), Aug. 11, 1927, C. L. Hubbs, 2 females.

New York: Cedar R., July 6, 1934, M. W. Sanderson, 1 female; Ithaca, P. W. Claassen, 1 male, 4 females.

Washington, D. C.: Oct. 29 (O. Heidemann Coll., Cornell U), 3 males, 5 females (det. by Uhler as *Corixa signata*).

Virginia: Vienna, Aug. 19, 1931, P. W. Oman, 17 males, 54 females.

Michigan: Nigger Creek, Mullett, Aug. 30, 1925, H. B. Hungerford, 8 males, 7 females; same place and collector, Aug. 4, 1925, 3 males, 3 females; Douglas Lake, 1924, same collector, 1 male; same place and collector, Aug. 6, 1927, 2 males, 5 females; same place and collector, Aug. 12, 1925, 1 female; same place and collector, July 23, 1925, 1 male; Cheboygan Co., July 25, 1931, same collector, 2 females.

Wisconsin: Dane Co., March 16, 1930, E. P. Breakey, 1 female.

Minnesota: Eveleth, Aug. 13, 1937, C. L. Johnston, 5 males, 1 female; Bengal, Aug. 18, 1922, H. B. Hungerford, 14 males, 23 females; Hibbing, Aug. 18, 1922, same collector, 11 males, 7 females; Carlson, Aug. 8, 1922, same collector, 1 female; Pelican R., Aug. 22, 1922, same collector, 7 males, 6 females; Itasca Pk., Aug. 21, 1922, same collector, 1 male; St. Paul, July 10, 1933, A. A. Granovsky, 1 female; same place and collector, July 16, 1932, 1 male; same place and collector, July, 1934, 3 males, 3 females; Minneapolis, Oct. 11, 1920, R. F. Hussey (Hussey Coll.), 2 males, 1 female; Olivia, June 28, 1921, H. H. Knight (Minn.), 6 males, 23 females; St. Paul, golf pond, June 27, 1921, W. E. Hoffmann (Minn.), 1 female; Beaver Dam, Aug. 12, 1922, H. B. Hungerford, 1 male.

Sigara (Vermicorixa) johnstoni n. sp.

(Plate XCV, figs. 5, 5a and 5b)

Size: Length 6.5 mm. to 7.1 mm. Width across eyes 1.85 mm. to 2 mm.

Color: General facies dark. Pronotum with 8 transverse dark bands a little wider than pale ones and interrupted down center by a pale longitudinal line. Claval pattern of transverse light and dark bands at base; pale markings elsewhere on clavus small zigzag figures; corium with pale figures in short, wavy, irregular maculations with no definite arrangement. Membrane and corium plainly separated by a pale line. Membrane with light and dark markings evenly distributed and somewhat transverse. Embolium smoky. Head and limbs pale; venter pale in female, basal abdominal segments of male smoky to black, pale elsewhere.

Structural characteristics: Head one-half as long as pronotal disk, a little longer in the male; interocular space narrower than the width of an eye; vertex narrow and produced beyond eye margins in both sexes as seen from above; male fovea oval, small, poorly defined; face not hairy; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 20 : 15 : 45 : 30 ♂ ; 1 : 2 : 3 : 4 :: 22 : 16 : 45 : 30 ♀. Pronotal disk with caudo-lateral and distal margins angulate, low median carina on anterior fourth, pronotum and hemelytra finely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow longer than that of the claval suture. Lateral lobe of prothorax elongate, sides parallel, tip obliquely truncate; mesoepimeron moderately narrow with osteole near the tip; metaxyphus broader than long, apex quadrate and slightly incised. Front leg of female of usual shape with about 20 lower palmar hairs on pala. Front leg of male: pala cultrate, broader distally than at base, dorsal margin carinate near base; 24 to 26 pegs in a single row which curves distally to follow margin, distal pegs longer than basal ones; tibia half as long as pala, with a thin dorsal carina and an oval pad; outside of pala with a low longitudinal ridge; femur slender with a pilose area on inner surface; trochanter with a prominent tumescence. Middle and hind legs relatively long and slender; hind femur with 2 or 3 rows of spines dorsally; proportions of segment to segment:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.3 : 31.5 : 44.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 82.5 : 112.5 : 40. Male asymmetry dextral; strigil moderately large, oblong, of 7 regular combs. For details of male structures see Plate XCV, figs. 5, 5a, and 5b. Female abdomen normal.

Comparative notes: The slightly incised tip of the metaxyphus will distinguish this species from its closest relatives.

Location of types: Holotype male, allotype female, and 2 male paratypes from Eveleth, Minn., Aug. 13, 1937, C. L. Johnston, in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate XCIX.) Besides the types we have seen 1 male from Normal, Ill. (Uhler Coll.). It is damaged but identifiable.

Sigara (*Vermicorixa*) *knighti* n. sp.

(Plate XCV, figs. 1, 1a and 1b)

Size: Length 5.5 mm. to 6.2 mm. Width across eyes 1.8 mm. to 1.9 mm.

Color: General facies dark. Pronotum with 6 broad, dark, transverse bands, interrupted medianly by a longitudinal line. Pale figures obliquely transverse on base of clavus; elsewhere, wavy, short, broken lines in irregularly transverse series; margins of sutures and of hemelytra pale; membrane and corium separated by a pale line; membranal pattern obscure. Embolium reddish yellow to smoky; head and abdominal venter dark; limbs and thoracic venter pale.

Structural characteristics: Head about half as long as pronotal disk; interocular space less than the width of an eye; rear margin of head carinate medianly; vertex projecting beyond curve of eyes as seen from above; face not hairy; male fovea narrow, rather deep, not attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 20 ♂; 1 : 2 : 3 : 4 :: 20 : 15 : 42 : 22 ♀. Pronotal disk with lateral margins rounded and apical margin angulate, median carina on anterior third; pronotum and hemelytra finely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow longer than that of the claval suture. Lateral lobe of prothorax elongate, narrow, slightly constricted at base, apex rounded; mesoepimeron of moderate width with osteole near the tip; metaxyphus broader than long, apex blunt. Front leg of female of usual shape with about 19 hairs in lower palmar row of pala. Front leg of male: pala cultrate, peg row interrupted apically with 6 pegs in row along distal margin and 14 pegs in basal row lying midway between dorsal margin and palm; outside of pala with longitudinal ridge; tibia two-thirds as long as pala, slight dorsal carina and no pad; femur slender, with pilose area on inner surface; trochanter with tumescence. Middle and hind legs slender; hind femur with 2 or 3 rows of spines dorsally; relative proportions:

Middle leg: femur : tibia : tarsus : claw :: 100 : 47.7 : 30.8 : 46.2. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 82.5 : 100 : 35. Male asymmetry dextral; strigil relatively small, transverse, oblong, of 5 regular combs. Median lobe of seventh abdominal segment rounded; short fringe of long hairs on left anal lobe just below median lobe of seventh segment. For details of male structures see Plate XCV, figs. 1, 1a, 1b. Female abdomen with anal lobes notched on inner ventral margin.

Comparative notes: This species closely resembles *S. mullettensis* Hungerford but may be distinguished in the male by the shape of the right clasper and in the female by having the anal lobes incised on the ventral inner margin.

Location of types: Holotype male, allotype female, labeled "Lake Isabella River, Aug. 14, 1922, H. B. Hungerford." Two male paratypes labeled "Burt Lake, Michigan, Fontenalis Run, July 7, 1923, H. B. Hungerford" and "Douglas Lake, Mich., July 18, 1927, H. B. Hungerford." All in the Francis Huntington Snow Entomological Collection, University of Kansas.

Data on distribution: (Plate XCIX.) Lake Isabella River is in Minnesota; Burt Lake and Douglas Lake are in Cheboygan county, Michigan.

Sigara (*Vermicorixa*) *hubbelli* (Hungerford)

(Plate XCVI, figs 1, 1a-1e)

1928 *Arctocorixa hubbelli* Hungerford, H. B. Can. Ent LX, pp. 228-229, Pl. 18, figs. 14, 15 and 16.

1986 *Arctocorixa hubbelli*, Walley, G. S. Can. Ent., Vol. LXVIII, No 3, p. 60 (compares with *A lineata* Forst , records from Kentucky and Tennessee).

Size: Length 4.6 mm. to 5.6 mm. Width of head across eyes 1.7 mm. to 1.9 mm.

Color: General facies light. Pronotum crossed by 6 to 8 narrow fairly regular brown bands, about half as wide as pale interspaces. Pattern usually, but not always, effaced at inner basal angle of the clavus. Clavus elsewhere cross-barred. Pattern of corium consisting of irregular, dark lines arranged in somewhat longitudinal series. Pattern of membrane obscure, almost effaced, separated from corium by a broad, pale line. Embolium, head, limbs and venter pale.

Structural characteristics: Head about half as long as pronotal disk; vertex rounded out beyond margin of eyes as seen from above; interocular space less than the width of an eye; facial hairs few; male fovea narrow, shallow, poorly defined; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 15 : 12 : 32 : 22 ♂ ; 1 : 2 : 3 : 4 :: 15 : 12 : 30 : 25 ♀. Pronotal disk reduced; faint indication of median carina visible on anterior fourth; apex rounded, pronotum and hemelytra moderately rastrate. Pruinose area of embolar groove posterior to nodal furrow equal in length to the pruinose area of the claval suture. Lateral lobe of the prothorax about half as broad at base as long, rounded apically; mesoepimeron narrow with osteole of scent gland near the tip; metaxyphus about as broad as long, pointed apically. Foreleg of female of usual shape. Foreleg of male: pala cultrate, 24 pegs in a single, slightly curving row, distal ones longer and more pointed than basal ones; tibia short, about a third as long as pala, somewhat rounded, with a short dorsal carina and no pad; femur moderately slender, sides nearly parallel, with a pilose area on inner surface and a short row of spine-like hairs extending from distal edge of tumid area. Middle and hind legs slender; hind femur pubescent for two-thirds its length, and with 5 or 6 short pegs in a row on dorsal surface near distal margin. Proportions of segment to segment as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 48.1 : 29.5 : 36.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 80 : 100 : 40. Male asymmetry dextral; strigil small, of about 5 rows of regular combs. Median lobe of seventh abdominal segment quite long, rounded apically. For details of male pala, abdomen, and genitalia see Plate XCVI, figs. 1, 1a to 1e.

Comparative notes: *S. hubbelli* may be distinguished from the other species of the *S. omani* (Hungfd.) group in that it has the pronotal disk reduced laterally.

Location of types: Described from series containing 9 specimens labeled "Fentress Co., Tenn., Allardt, Aug. 17, 1922, T. H. Hubbell"; 8 specimens "Becker Co., Minn., Shell Lake, Aug. 22, 1922, H. B. Hungerford"; 8 specimens "Louisiana 2337, C. F. Baker Coll."; 12 specimens "Opelousas, Pilate, La."; 1 specimen "Woodville, Miss., 7-26-21." Holotype and allotype in Museum of Zoölogy, University of Michigan. Paratypes in Francis Huntington Snow Entomological Collections, University of Kansas, and University of Minnesota Entomological Collection.

Data on distribution: (Plate XCVIII.)

CANADA: *Ontario:* Ridgeway, Aug. 7, 1889 (Lutz Coll.), 2 males.

U. S. A.: *Florida:* Wakulla Springs, July 14, 1934, R. H. Beamer, 1 female.

Georgia: Okefenokee Swamp, July 30, 1934, M. E. Griffith, 3 males; same place and date, P. McKinstry, 1 male, 1 female; same place, July 25, 1939, R. H. Beamer, 2 males, 1 female; same place, July 27, 1939, J. D. Beamer, 2 males, 7 females; Baker Co., Dec. 23, 1946, L. W. Morgan, 19 males, 35 females.

North Carolina: Raleigh, Nov. 22, 1904, 1 male, 1 female; Warsaw, May 19, 1905, F. Sherman, 1 female.

Virginia: Vienna, May 30, 1932, P. W. Oman, 1 male.

West Virginia: Morgantown, Aug., 1923, 1 male.

Washington, D. C.: Jan. 10, July 10, June 11 (O. Heidemann, Cornell U.), 3 males, 2 females.

Maryland: Pawtuxent Wild Life R., April 11, 1945, R. I. Sailer, 11 males, 15 females (U. S. N. M.).

Pennsylvania: Philadelphia, June 19, 1929, J. C. Lutz (Lutz Coll.), 1 female.

New Hampshire: Franconia, Mrs. A. T. Slosson, 1 male.

Indiana: Lawrence Co., Aug. 7, 1907, W. S. B. (Blatchley), 2 females.

Illinois: Olive Branch, Oct. 8, 1909, Gerhard (Field Mus.), 1 female.

Iowa: Oct. 27, 1939, Patterson (Iowa Wesleyan), 1 female.

Tennessee: Fentress Co., Aug. 17, 1922, T. H. Hubbell, 6 males, 3 females.

Mississippi: Woodville, 1 female; Lauderdale, July 17, 1930, R. H. Beamer, 12 males, 24 females; Vicksburg, July 14, 1921, C. J. Drake, 1 female.

Alabama: Crawford, July 24, 1930, P. W. Oman, 10 males, 7 females.

Louisiana: C. F. Baker (Baker Coll.), 1 male, 6 females; Opelousas Pilate, 5 males, 13 females (U. S. N. M.); Baton Rouge, March 9, 1929, R. M. DeCoursey, 1 male, 1 female; Winn Co., Winnfield, July 14, 1918, G. R. Pilate, 1 female (Mich. Coll.).

Arkansas: Scott Co., Aug. 23, 1938, R. H. Beamer, 1 female; Lawrence Co., B. C. Marshall, 3 males, 1 female; Lawrence Co., April 15, 1922, B. C. Marshall (Van Duzee), 1 male, 1 female.

Missouri: Columbia, May 2, 1936, W. M. Gordon, 3 females.

Minnesota: Becker Co., Aug. 22, 1922, H. B. Hungerford, 6 males, 2 females; St. Paul, July 14, 1921, same collector (Minnesota), 1 male, 1 female.

Kansas: Douglas Co., July 28, 1928, P. B. Lawson, 1 male; same place, Rock Pool, May 30, 1916, H. B. Hungerford, 8 males, 5 females; same place, Rock Creek, same collector, 1 female; same place, Stubbs Pond, April 8, 1921, same collector, 4 females; same place, Oct. 28, 1921, Robert Guntert, 1 male; Osage Co., June 15, 1923, R. H. Beamer, 1 male, 1 female.

Sigara (*Vermicorixa*) *defecta* n. sp.

(Plate XCVI, figs. 2, 2a-2e)

1936. *Arctocorixa bicoloripennis* Walley, G. S. Can. Ent. LXVIII, p 56 (in part) (1 ♀ labeled "paratype" is NOT *bicoloripennis* but *defecta* n. sp.).

Size: Length 5.5 mm. to 6.3 mm. Width of head across eyes 1.8 mm. to 2 mm.

Color: General facies medium to dark. (Eastern specimens tend to be darker than those from the more central part of the United States). Pronotum crossed by 7 to 8 fairly regular brown bands, a little narrower than pale interspaces. Pattern usually, but not always, complete at base of clavus; tendency seems to be for the darker specimens to have the pattern complete, and for paler specimens to have the pattern at the inner basal angle of the clavus effaced. Clavus cross-banded. Pattern of corium consisting of irregular dark lines arranged in longitudinal series. Membranal pattern definite, but much broken; separated from corium by pale line. Embolium, head and limbs pale; abdominal venter smoky in dark specimens, pale in light ones.

Structural characteristics: Head about two-thirds as long as pronotal disk; interocular space less than the width of an eye: male vertex rounded out beyond margin of eyes as seen from above; male fovea narrow, shallow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 16 : 40 : 28 ♂; 1 : 2 : 3 : 4 :: 21 : 16 : 40: 30 ♀. Pronotal disk not reduced; with median carina visible on anterior third; rounded apically. Pronotum and hemelytra moderately rastrate. Pruinose area of the embolar groove posterior to nodal furrow a trifle shorter than the pruinose area of the claval suture. Lateral lobe of prothorax about half as broad at base as long, sides parallel, rounded apically. Mesoepimeron narrow with osteole near its tip. Metaxyphus plainly broader than long. Foreleg of female of usual shape. Foreleg of male: pala rather broad at base, truncate apically; about 26 pegs in a curved row with the last 2 or 3 set wide apart; tibia slender, about half as long as pala, without a pad; femur slender with pilose area on inner surface. Middle and hind legs slender; middle femur not spinose; hind femur with short row of 8 or 10 short pegs on dorsal surface near apex; middle tibia and tarsal claw equal in length; first tarsal segment of hind leg longer than the femur. Comparative measurements of segments:

Middle leg: femur : tibia : tarsus : claw :: 100 : 41.6 : 30.8 : 41.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 84.2 : 115.7 : 44.7. Male asymmetry dextral; strigil rather small, nearly oval, of 6 regular combs. Median lobe of seventh abdominal segment almost triangular. For details of male pala, abdomen and genitalia see Plate XCVI, figs. 2, 2a, 2b, 2c, 2d and 2e.

Comparative notes: This species is close in general appearance and structure to *hubbelli* Hungerford, but differs from it in both sexes in having the pronotal disk not reduced.

Location of types: Holotype male, allotype female, and 7 male and 20 female paratypes from St. Paul, Minn., Golf Pond, July 31, 1921, H. B. Hungerford; 3 male and 9 female paratypes, same place and collector, July 28, 1921; 10 male and 7 female paratypes, same place and collector, July 14, 1921; and 8 male and 2 female paratypes, same place, May 5-June 1, 1934, at light, A. A. Granovsky. The above in the Francis Huntington Snow Collections, University of Kansas. Five male and 5 female paratypes labeled "St. Paul, Minn., May 5-June 1, 1934, at light, A. A. Granovsky" in the University of Minnesota collections.

Data on distribution: (Plate XCVIII.) Besides the type series, we have records of the following:

CANADA: *Ontario:* Minaki, July 4, 1928, J. McDunnough, 1 female (labeled by G. S. Walley as a paratype of *A. bicoloripennis* Walley).

U. S. A.: *New York:* Cold Springs Harbor, July 20, 1920, P. Butler (Hussey Coll.), 3 males; Queen's Village, L. I., Aug. 8, 1941, J. C. Lutz (Lutz Coll.), 1 male; Long Island, Cold Springs Harbor, July 11, 1919, H. M. Parshley (Parshley Coll.), 1 male.

Pennsylvania: Pittsburgh (Holland Coll., Carn. Mus.), 5 males, 1 female.

Maryland: Plummer's Island, March 24, 1907, W. L. McAtee, 1 male; Pawtuxent Wild Life R., April 11, 1945, R. I. Sailer, 14 males, 3 females.

Virginia: Vienna, Sept. 19, 1931, P. W. Oman, 1 male, 1 female.

North Carolina: Southern Pines, A. H. Manee (Parshley).

Michigan: Ann Arbor, June 24, 1921, R. F. Hussey (Hussey Coll.), 6 females.

Illinois: Ginn's Pond, Lake Forest, Torre-Bueno (Bueno Coll.), 1 male, 1 female.

Wisconsin: Dane Co., April 19, 1930, E. P. Breakey, 1 male, 2 females; Baraboo, May 20, 1914, J. G. Saunders (Wis.), 1 male.

Minnesota: St. Paul, Golf Pond, July 31, 1921, H. B. Hungerford, 1 male; same place, Oct. 22, 1919, R. F. Hussey (Hussey Coll.), 12 males, 8 females; same place, June 20, 1921, H. B. Hungerford, 4 males, 2 females; same place, June 25, 1934, A. A. Granovsky, 4 males, 5 females; same place and collector, July, 1934, 35 males, 19 females; same place and collector, June 4, 1934, 12 males, 13 females; same place and collector, July 16, 1932, 6 males, 9 females; same place and collector, June 29, 1931, 22 males, 22 females; same place and collector, June 30, 1933, 1 male, 1 female; same place and collector, July 9-26, 1933, 43 males, 20 females; Cannon Falls, Aug. 16, 1934, D. J. Pletch, 1 male, 1 female; St. Louis Co., Aug. 14, 1922, H. B. Hungerford, 1 male, 1 female; Olivia, June 28, 1921, H. H. Knight, 1 male; Hennepin Co., July 20, 1921, W. E. Hoffmann, 1 male; Benson, Aug. 23, 1922, H. B. Hungerford, 1 male, 1 female; Minnehaha Cr., Hennepin Co., July 9, 1921, H. B. Hungerford, 3 females; St. Paul, July 14, 1921, same collector (Minn.), 4 males, 1 female; same place, Hussey's Pond, June 29, 1921, W. E. Hoffmann (Minn.), 1 male; Olivia, July 28, 1921, same collector and collection, 5 males.

Sigara (Vermicorixa) omani (Hungerford)

(Plate XCVI, figs 5, 5a and 5b; wash drawing No 41, Plate VII)

1930 *Arctocorixa omani* Hungerford, H B. Pan-Pac Ent Vol. VII, No 1, p. 25, figs 3 and 4

1931 *Sigara omani*, Jaczewski, T Archiv fur Hydrobiologie, Bd XXIII, pp 513-14, figs 13-16. (Records from Washington)

Size: Length 5.1 mm. to 6.7 mm. Width across eyes 1.8 mm. to 2.1 mm.

Color: General facies medium brown. Pronotum crossed by 9 or 10 narrow, broken, irregular dark lines, the anterior ones not quite attaining the lateral margins. Clavus and corium with pale and dark lines in broken, transverse series. Corium and membrane separated by a pale line. Membranal pattern obscure and reticulate. Embolium smoky; head and limbs pale. Venter of female pale, that of male usually dark.

Structural characteristics: Head about half as long as the pronotal disk; interocular space equal to the width of an eye; vertex smoothly rounded in both sexes; face with a few long hairs; male fovea shallow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 25 ♂; 1 : 2 : 3 : 4 :: 20 : 18 : 40 : 28 ♀. Pronotal disk rounded laterally and apically, with median carina on anterior third; pronotum and hemelytra heavily rastrate; pruinose area of embolar groove posterior to the nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax elongate, sides parallel, tip truncate; mesoepimeron narrow with osteole near tip; metaxyphus triangular, as broad at base as long, apex pointed. Foreleg of female of usual shape. Foreleg of male: pala cultrate, broader apically than basally, carinate on dorsum at base, with about 20 pegs in a single distally curving row; tibia about two-thirds as long as pala, with a short dorsal carina and no pad; femur moderately slender, with pilose area at base. Middle and hind legs slender; hind femur with 1 to 3 spines dorsally; segmental proportions of legs as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.9 : 32.8 : 41. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.2 : 117.6 : 44. Male asymmetry dextral; strigil of moderate size, oval, of 7 regular combs. For details of male structures see Plate XCVI, figs. 5, 5a and 5b. Female abdomen normal.

Comparative notes: This species is most closely allied to *S. nevadensis* (Walley), from which it may be distinguished by having the interocular space equal to the width of an eye as measured by projection, by having the male pala broadest beyond the middle with no ridge across its face, and by having the pronotal disk with lateral margins rounded.

Location of types: Described from thirty-four specimens from Carson City, Nevada, Aug. 9, 1929, R. H. Beamer. Holotype, allotype and some paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas. Paratypes also in the U. S. National Museum and the California Academy of Science.

Data on distribution: (Plate XCVIII.)

CANADA: *British Columbia:* Prince Rupert, Jan. 1, 1944, Norman Carter, 9 males, 17 females; Chilliwack, April 20, 1925, 1 male; Vancouver Island, Aug. 8, 1898, G. W. Taylor, 1 male, 2 females.

U. S. A.: *Washington:* Kalama R., Aug. 22, 1923, C. H. Martin, 1 male; same place, July 21, 1931, L. D. Anderson, 1 male, 1 female; Puyallup, July 5, 1935, Jean Russell, 1 male; Kent, Aug. 22, 1933, C. H. Martin, 1 male; Cliffdell, July 7, 1935, Jack Beamer, 1 female; Arlington, July 23, 1931, L. D. Anderson, 3 males, 2 females; Mason Co., L. Cushman, 1919, P. Putnam, 27 males, 38 females (Mich. Coll.); Whitman Co., Palouse R., Oct. 24, 1919, P. Putnam, 1 female (Mich. Coll.); (Cornell), 1893, 1 male, 4 females.

Oregon: Waldport, July 11, 1935, R. H. Beamer, 26 males, 46 females; Florence, July 11, 1935, Jack Beamer, 16 males, 18 females; Hood R., July 17, 1931, L. D. Anderson, 19 males, 30 females; Hot Lake, July 13, 1931, same collector, 1 female; N. Powder, same date and collector, 7 males, 9 females; Corvallis, May 1, 1936, Virgil Starr, 1 male; same place, July 5, 1929, J. E. Davis, 2 males, 1 female; Modoc Point, July 1, 1935, R. H. Beamer, 1 male, 3 females; same place and date, Jack Beamer, 1 male; Yoncalla, July 12, 1935, R. H. Beamer, 3 males, 5 females; Corvallis, Aug. 8, 1925 (Brooklyn Mus. Coll.), 2 males, 6 females; so. of Worden, July 1, 1935, P. W. Oman (U. S. N. M.), 1 female.

California: S. L. Obispo Co., June 1, 1916, C. L. Hubbs (Field Mus.), 1 male; Lake Tahoe, Aug. 11, 1940, L. C. Kuitert, 62 males, 54 females; Berkeley, Oct. 23, 1927, Jean Linsdale, 5 males, 8 females; same place and collector, April 26, 1933, 1 female; Sequoia Nat. Park, July 15, 1907, J. C. Bradley (Kirk Coll.), 2 females; Three Rivers, July 12, 1907 (Cornell Coll.), 1 female; Red Bluff, June 27, 1935, Jack Beamer, 1 female; same place and date, Jean Russell, 2 females; Weed, June 29, 1935, Jean Russell, 1 male; same place and date, R. H. Beamer, 2 males, 2 females; Mono Lake, May 12, 1917, C. L. Fox, 4 males, 4 females; Eagle Lake, Lassen Co., July 31, 1921, J. O. Martin, 1 male; Mammoth Lake, July 29, 1940, L. C. Kuitert, 1 male; Viola, May 21, 1941, C. Michener, 2 males, 4 females; Lone Pine, July 28, 1940, L. C. Kuitert, 9 males, 14 females; Tuoleme Meadows, Aug. 1, 1940, same collector, 1 male, 2 females; Sequoia Nat. Pk., Aug. 6, 1940, same collector, 9 males, 12 females; Stanford U. (purch. from Wash. U. Coll.), 1 male, 1 female; (Uhler Coll.), 2 males; Phillips Station, Eldorado Co., July 24, 1921, F. E. Blaisdell, 7,000 ft. elev., 1 male, 1 female (Van Duzee); Modoc Co., Surprise Valley, Aug. 6, 1934, C. L. Hubbs (Mich.), 1 male.

Nevada: Carson City, Aug. 9, 1929, R. H. Beamer, 9 males, 18 females; same place and date, P. W. Oman, 1 male, 1 female; Reno, Oct., 1939, La Rivers, 1 male, 2 females.

Arizona: (Uhler Coll.), 1 male.

Idaho: Moscow, 2 males.

Wyoming: Yellowstone Park, Aug. 15, 1931, L. D. Anderson, 4 males, 6 females; same place, Shoshone Basin, C. T. Brues, 1 male.

Sigara (*Vermicorixa*) *nevadensis* (Walley)

(Plate XCVI, figs 6, 6a and 6b)

1936. *Arctocorixa nevadensis* Walley, G. S. Can. Ent. LXVIII, pp 58-59, Pl. II, figs. 1-4 (Humboldt River, Nevada).

Size: Length 5.3 mm. to 6.6 mm. Width across eyes 1.7 mm. to 1.9 mm.

Color: General facies pale to medium brown. Pronotum crossed by 6 or 8 narrow brown lines, none of them attaining the lateral margins, posterior ones broken and irregular. Clavus with dark lines in transverse series, usually etched away on inner basal angles, Corium with dark pattern transverse, but more irregular and tending to coalesce along margins. Membrane separated from corium by a pale line; pattern reticulate. Embolium, head, limbs and venter pale.

Structural characteristics: Head half as long as pronotal disk, with median carina on distal margin; vertex slightly produced in both sexes as seen from above; interocular space equal to or slightly greater than the width of an eye; face with a few hairs; male fovea poorly defined, narrow and shallow; antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 17 : 40 : 23 ♂ ; 1 : 2 : 3 : 4 :: 23 : 17 : 43 : 25 ♀ . Pronotal disk acutely angulate laterally, rounded distally; median carina barely visible on anterior third; pronotum and hemelytra finely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture; embolium rather broader, compared to width of a hemelytron, than is usually the case. Lateral lobe of the prothorax elongate, a little broader at base than across tip which is truncate; mesoepimeron narrow with osteole near tip; metaxyphus about as long as broad, blunt distally. Foreleg of female of usual shape. Foreleg of male: Pala not carinate on outside, broadest across basal portion, with an oblique ridge across inner surface at about the middle, about 32 pegs arranged as in Plate XCVI, fig. 6a; tibia short, about half as long as pala, with a pronounced dorsal carina; femur slender with a basal pilose area. Middle and hind legs slender; hind femur with 4 to 6 spines on dorsal surface; proportions as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 48.2 : 29.2 : 43. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 87.9 : 106.1 : 51.5. Male asymmetry dextral; strigil of moderate size, with 7 irregular combs. For details of male structures see Plate XCVI, figs. 6, 6a and 6b. Female abdomen normal.

Comparative notes: Though closely related to *S. omani* (Hungfd.), this species may be distinguished from it by having the lateral margin of the pronotal disk acute and by having an oblique ridge across the face of the male pala.

Location of types: Holotype male, allotype female, and some paratypes labeled "Humboldt River, Nevada (S. Garman)" in the Museum of Comparative Zoölogy, Cambridge, Mass. Some paratypes, No. 4045, in Canadian National Collection, Ottawa, Canada. Two paratypes, male and female, in the Francis Huntington Snow Entomological Collections, University of Kansas.

Dtat on distribution: (Plate XCVIII.)

Nevada: Humboldt R., August, Garman (via Walley), 1 male, 1 female (paratypes).

Utah: Lehi, June, 1930, G. F. Knowlton (Utah Exp. Sta.), 1 male; Weber Canyon, July 4, 1931, J. Nottingham, 1 male; Far West, April 12, 1924, C. J. D. Brown, 1 male; Tremonton, July 5, 1931, L. D. Anderson, 22 males, 11 females; Hooper, at light, July 21, 1940, Knowlton and Dorst, 12 males, 2 females.

Wyoming: Sweetwater Co., Green R., Sept. 16, 1934, C. L. Hubbs (Mich.), 1 male.

Sigara (*Vermicorixa*) *pectenata* (Abbott)

(Text fig. 16)

1913 *Arctocorisa pectenata* Abbott, J F Bull Brooklyn Ent Soc, Vol. VIII, p 83, text fig. of pala

1917 *Arctocorixa pectenata*, Van Duzee, E P. Catalogue of the Hemiptera . . , p. 483

1926 *Arctocorixa pectenata*, Blatchley, W. S Heteroptera of Eastern North America, p. 1080

1928 *Arctocorixa pectenata*, Torre-Bueno, J. R. de la, *in* "A List of the Insects of New York," p 141 (Cornell Univ. Agri. Exp. Sta. Memoir 101).

1938. *Arctocorixa pectinata*, Brimley, C. S Insects of North Carolina, p. 84.

1939. *Arctocorixa pectenata*, Millspaugh, Dick D. Field and Laboratory, Vol. VII, No. 2, p 85.

Size: Length 4.4 mm. to 5 mm. Width of head across eyes 1.5 mm. to 1.7 mm. General shape rather short and compact.

Color: General facies rather dark. Pronotum crossed by 7 or 8 narrow, regular brown bands. Clavus crossbanded with narrow, irregular brown bands, almost effaced on inner basal angle. Corial pattern of short, irregular brown markings arranged in more or less transverse series. Membrane plainly separated from corium by pale line. Embolium smoky to black; head and limbs pale, venter pale to smoky.

Structural characteristics: Head about half as long as pronotal disk, interocular space less than width of an eye; vertex not produced beyond eye margins as seen from above, facial hairs few, male fovea shallow, narrow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 15 : 28 : 25 ♂ ; 1 : 2 : 3 : 4 :: 18 : 14 : 30 : 28 ♀. Pronotal disk slightly reduced—at least, not extending as far laterad as outer basal angle of clavus, median carina visible on anterior fourth; disk roundly pointed apically; pronotum and hemelytra finely rastrate. Pruinose area of the embolar groove posterior to the nodal furrow equal in length to the pruinose area of the claval suture. Lateral lobe of prothorax elongate, its anterior distal angle produced; mesoepimeron about as wide as thoracic lobe, osteole about one-third of way from tip to lateral bend; metaxyphus broader than long, tip rounded. Front leg of female of usual shape. Front leg of male: pala with dorsal ridge or hump about midway of length; this ridge extends down across surface of pala; peg row consisting of 24 or 25 pegs which almost overlap the upper palmar row of bristles; tibia slender, about half as long as pala, with slight dorsal carina and no pad; femur rather stout, sides tapering from broad base toward tibial joint; pilose area on inner surface. Middle and hind legs slender; comparative measurements of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 40 : 30 : 40. Hind leg: femur : tibia : tarsus 1 : tarsus :: 100 : 79.9 : 100 : 43.3. Male asymmetry dextral; strigil small, suboval, of 5 regular combs, and lying almost at lateral margin of sixth abdominal segment. Median lobe of seventh abdominal segment broadly triangular. For details of male pala, abdomen, and genitalia see text fig. 16. Female abdomen normal.

Comparative notes: This is not a striking species in any way except for the shape of the male pala.

Location of types: Holotype male, allotype female, Marietta, Ga., March 5, 1911, in the Cornell Collection, Ithaca, N. Y.

Data on distribution: (Plate XCIX.)

U. S. A.: *New Jersey:* Lakehurst, May 30, 1903, 1 male.

Maryland: Odenton, July 4, 1913, W. L. McAtee, 4 males, 4 females (U. S. N. M.); Plummer's Island, April 27, 1913, W. L. McAtee, 1 female (U. S. N. M.).

Washington, D. C.: Sept. 19, 1890 (O. Heidemann, Cornell U.), 1 male, 1 female.

Virginia: Bluemont, Aug. 31, 1913, W. L. McAtee (U. S. N. M.), 4 females; Vienna, July 17, 1913 (Barber Coll.), 1 male; Warrenton, June 7, 1928, L. C. Woodruff, 1 male.

North Carolina: Raleigh, Dec. 28, 1904, C. S. Brimley (Brimley Coll.), 3 males, 7 females.

Georgia: Stone Mt., Aug. 3, 1912, 4 males, 6 females; Wrens, Aug. 22, 1930, P. W. Oman, 2 males, 2 females.

Alabama: St. Meigs, July 21, 1930, R. H. Beamer, 1 male, 1 female; (Kirkaldy Coll.), 1 male; (C. F. Barber in U. S. N. M.), 8 males.

Tennessee: Coal Creek, Aug. 27, 1930, P. W. Oman, 1 male.

Mississippi: Lauderdale, July 17, 1930, P. W. Oman, 15 males, 17 females; same place and date, R. H. Beamer, 12 males, 8 females; same place and date, L. D. Tuthill, 5 males, 4 females; Columbus, July 16, 1930, R. H. Beamer, 2 males; Beaumont, April 19, 1932, H. Dietrich, 1 male, 1 female.

Indiana: Tippecanoe Co., May 5, 1934, H. E. Brown (Mo. Col.), 1 female.

Missouri: Fulton, Nov. 7, 1940 (pond) (Mo. Coll.), 1 male; Eldon, Oct. 23, 1940 (Mo. Coll.), 1 male.

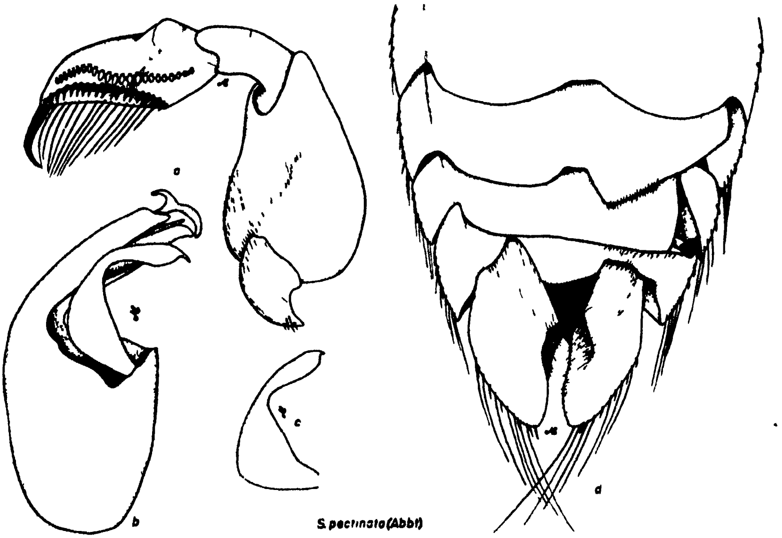

FIG. 16. *Sigara* (*Vermicorixa*) *pectenata* (Abbott); (a) front leg of male; (b) genital capsule of male; (c) right clasper of male; (d) dorsal view of male abdomen.

Oklahoma: Tulsa Co., March 21, 1922, G. C. Wiley, 20 males, 50 females; same place and collector, March 16, 1922, 1 male.

Texas: Wood Co., Feb. 26, 1939, D. O. Millspaugh, 1 male.

Sigara (*Vermicorixa*) *cubiensis* n. sp.

(Plate XCVI, figs. 3, 3a and 3b)

Size: Length 5.5 mm. Width across eyes 1.6 mm.

Color: General facies pale. Pronotum crossed by 6 or 7 narrow brown bands, somewhat broken on distal portion. Basal inner angle of clavus pale; elsewhere, pattern is arranged in faintly longitudinal series, but is very indistinct. Membrane semihyaline. Embolium, head, limbs and venter pale.

Structural characteristics: Head three-fourths as long as the pronotal disk; interocular space about equal to the width of an eye; vertex of male rounded, not produced; fovea shallow, barely discernible; antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 12 : 30 : 18 ♂. Pronotum finely rastrate, without a median carina, rounded laterally and distally; hemelytra, including membrane, finely pitted; hemelytra covered with fine hairs. Pruinose area of the embolar groove posterior to the nodal furrow equal in length to that of the claval suture. Lateral lobe of the prothorax slender with posterior distal angle rounded and anterior one anteriorly produced. Mesoepimeron narrow with osteole near the tip; metaxyphus about as broad as long.

Front leg of male: pala slender with about 24 pegs in peg row, of which the distal 7 or 8 are elongate; tibia slender with a rounded pad at distal end; femur slender with a stridular area of 8 or 9 rows of pegs on inner basal surface. Middle and hind legs slender, with a short row of short spines on dorsal surface of the hind femur; comparative measurements of segments:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.2 : 28.8 : 44.2. Hind leg: femur : tibia : tarsus 1: tarsus 2 :: 100 : 92.8 : 121.4 : 46.4. Male asymmetry dextral, strigil small, of 3 combs. Right lobe of seventh abdominal segment angularly produced. For details of male structures see Plate XCVI, figs. 3, 3a and 3b.

Comparative notes: This species is nearest in structure to *S. quebecensis* (Walley), from which it differs in having the male pala broadest across the basal third and in having the right lobe of the seventh abdominal segment with a lateral projection. In addition it lacks a strigilar area on the front femur.

Location of types: Holotype male, allotype female, and 2 male paratypes labeled "Camaguey, Cuba, Aug. 10, 1924, J. Acuna" in the Francis Huntington Snow Entomological Collections, University of Kansas. In the U. S. National Museum are 2 male paratypes labeled as follows: "Cuba, P. R. Uhler Coll." and " Aguadilla, Porto Rico, Jan., 1899, August Busck."

Data on distribution: Known only by the type series. (See Plate XCVIII.)

Sigara (*Vermicorixa*) *scabra* (Abbott)

(Text figure 17; wash drawing No 22, Plate V)

1913. *Arctocorisa scabra* Abbott, J F Bull Brooklyn Ent Soc., VIII, pp. 83, 88 and 90. (From Georgia and characterized in his keys on pp. 88 and 90.)

1915. *Arctocorisa scabra* Abbott, J. F. Washington Univ. Studies (St. Louis, Mo.), pp. 83-84, Pl. XV, fig. 5. (Description 2 male types, Billy's Isl , Okefenokee Swamp, Ga.)

1917. *Arctocorixa scabra,* Van Duzee, E P. Catalogue of Hemiptera, p. 483.

1917. *Arctocorisa scabra,* Parshley, H. M. Occasional Papers of the Boston Soc. of Nat. Hist., VII, p. 119 (Det. by Abbott but all wrong.) (Orono, Me. = *grossolineata*; Durham, N. H. = *grossolineata* and *signata*; Linn, Mass. = *grossolineata*; Providence, R. I. = *signata*; Cheshire, Conn. = *signata*; New Haven, Conn. = *mathesoni*)

1922 *Arctocorixa scabara*, Drake, Carl J. Tech. Pub. No. 16 of N. Y. State College of Forestry at Syracuse Univ., p. 86. (Wrong determination. Some other species. Not now in Drake collection.)

1923 *Arctocorisa scabra*, Abbott, J. F., *in* Guide to Insects of Conn., Pt. IV, The Hemiptera or Sucking Insects of Conn., p. 390, fig. 36 (17). (Wrong det. See note under Parshley above.)

1926. *Arctocorixa scabra*, Blatchley, W S. Heteroptera of Eastern North America, p. 1080, Pl. XII, fig. 17 (same errors as above).

1928. *Arctocorixa scabra*, Torre-Bueno, J. R de la, *in* List of Insects of New York, p. 141, Cornell Univ. Agri. Exp. Sta. Memoir 101. (Bean Pond, Cranberry Lake.) (Based on Drake's 1922 record. Wrong det)

1938 *Arctocorixa scabra*, Brimley, C S. Insects of N Carolina, p. 84.

Size: Length 4 mm. to 5 mm. Width across eyes 1.3 mm. to 1.7 mm.

Color: General facies medium brown. Pronotum crossed by 8 dark bands, a little thinner than pale spaces, and for the most part unbroken; some tendency for the distal 4 or 5 to coalesce along lateral edges of disk. Clavus cross-banded, the bands somewhat irregular in shape. Corial pattern somewhat confused, often obscure in males; dark lineations tending to coalesce near inner distal angle; outer distal angle of corium and margin beyond embolar groove semihyaline; corium separated by pale line from membrane which has obscure, in some cases almost nonexistent, pattern. Embolium reddish brown; head and limbs pale; venter pale to smoky in males.

Structural characteristics: Head about two-thirds as long as pronotal disk; interocular space less than the width of an eye;

inner margins of eyes almost parallel, especially in males; vertex of male not produced as seen from above; face not hairy; male fovea oval, narrow, rather shallow; antennal segmentation: 1 : 2 ; 3 : 4 :: 18 : 15 : 32 : 28 ♀; 1 : 2 : 3 : 4 :: 18 : 12 : 30 : 28 ♂. Pronotal disk reduced, lateral and distal margins rounded, giving disk a heart-shaped appearance; median carina on anterior fourth; pronotum and hemelytra finely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow shorter than that of claval suture. Lateral lobe of prothorax slender, elongate, tip rounded; mesoepimeron narrow with osteole near tip; metaxyphus plainly broader than long, apex blunt. Front leg of female of usual shape except pala depressed on dorsal margin near apex. Front leg of male as in text figure 17. Middle and hind legs slender, hind femur with 2 or 3 stout spines on dorsal surface; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.4 : 32.5 : 44.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 84.4 : 107.1 : 45.1. Male asymmetry dextral; strigil small, oval, of 4 regular combs; median lobe of seventh segment triangular. For details of male structures see text figure 17.

Comparative notes: This little species runs out in our key with *S.* (*P.*) *macropala* Hungerford but has a reduced pronotal disk that is heart-shaped, its lateral margins thickened.

Location of types: Although Abbott, 1915, says "Types, two males from Billy's Island, June," I find 3 males, labeled "Billy's Island, Okefenokee Swamp, June 1912" and "cotype" in the Cornell collection, Ithaca, N. Y. One of these we are labeling "lectotype" and 1 male cotype we are placing in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate CIV).

Mississippi: Green Springs, Aug. 2, 1921, C. J. Drake (Drake), 1 female.

Alabama: (Baker Coll. in U. S. N. M.), 1 male.

Georgia: Okefenokee Swamp, Billy's Island, June 1912, 3 males; Wrens, Aug. 22, 1930, P. W. Oman, 5 males, 4 females.

North Carolina: Raleigh, Jan. 4, 1922, F. Sherman, 1 male; Clemson College, March 25, 1930, J. G. Watts, 1 male.

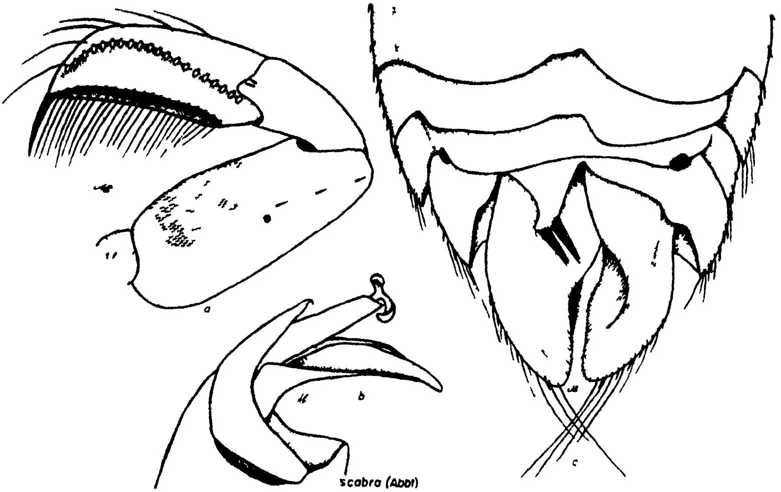

FIG. 17 *Sigara* (*Vermicorixa*) *scabra* (Abbott), (a) front leg of male, (b) genital capsule of male (c) dorsal view of male abdomen

Sigara (*Vermicorixa*) *gordita* (Abbott)

(Plate C, fig. 1, 1a and 1b)

1913. *Corixa gordita* Abbott, J. F. Bull. Brooklyn Ent. Soc., Vol. VIII, pp. 84-85, Plate figs. 2, 2a (Cave Springs, Blackshear and Marietta, Ga.). Only Cave Springs material fit this species.

1917. *Arctocorixa gordita*, Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico, p. 486.

1926. *Arctocorixa gordita*, Blatchley, W. S. Heteroptera of Eastern North America, p. 1079, fig. 215, k (Georgia).

1938. *Arctocorixa gordita*, Brimley, C. S. Insects of North Carolina, p. 84.

Size: Length 4 mm. to 4.5 mm. Width of head across eyes 1.3 mm. to 1.5 mm. Small and rather compact in shape.

Color: General facies dark. Pronotum crossed by 6 or 7 fairly regular brown bands, equal in width to pale interspaces. Clavus cross-banded at base and apex, pattern tending to coalesce on central portion. Corial pattern in somewhat longitudinal series, tending to coalesce across wing from inner apical angle of corium to apex of embolar groove. Membrane separated from corium by pale line. Membranal pattern reticulate with plain brown border apically. Embolium, head, and limbs pale; venter smoky.

Structural characteristics: Head about as long as pronotal disk; interocular space less than width of an eye; vertex of male not produced beyond eye margins as seen from above; facial hairs few; male fovea scarcely discernible; antennal measurements: 1 : 2 : 3 : 4 :: 19 : 15 : 35 : 25 ♂; 1 : 2 : 3 : 4 :: 20 : 15 : 35 : 25 ♀. Pronotal disk with indication of median carina on anterior third; anteriorly this may be prominent and pale; rounded apically; pronotum and hemelytra finely rastrate, the latter with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow equal in length to pruinose area of claval suture. Lateral lobe of prothorax about half as broad at base as long, tip rounded; mesoepimeron broad, osteole about half way between tip and lateral emargination. Metaxyphus about as broad as long. Front leg of female with pala not depressed dorsally near apex but space above upper palmar row of hairs narrow. Front leg of male: pala long and narrow, apex bluntly curved; about 23 pegs in an almost straight row; tibia about half as long as pala, with short dorsal carina and a shallow depression on distal margin bearing a tuft of hairs; femur slender, with pilose area on inner surface. Middle and hind legs slender; hind femur with 3 or 4 short spines on dorsal surface near apical margin; comparative measurements as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.7 : 32 : 49. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 82.1 : 107.1 : 50. Male asymmetry dextral, strigil small, oval, of 3 regular combs. For details of male structures see Plate C, fig. 1, 1a and 1b.

Comparative notes: In the original description Abbott indicates that the male is sinistral, yet the holotype is dextral. Evidently he thought the species belonged to what is now *Trichocorixa.* In his key to males he runs this species out with *Corixa* but in his key to females gives it as *Arctocorisa gordita.*

Location of types: The Cornell Collection, Ithaca, N. Y., has holotype male, allotype female and 2 female paratypes from Cave Springs, Ga., Aug. 20, 1909, and I have found 2 males, 6 females that should have been labeled paratypes. They were taken at the same time and place. Abbott says "Others in the collection (paratypes) from Blackshear and Marietta, March." However, since he did not label his paratypes, I do not know what he had but there are no specimens from these places in the Cornell collection that belong to this species.

Data on distribution: (Plate CIV.)

Georgia: Cave Springs, Aug. 20, 1909 (Cornell Coll.), 2 males, 6 females.

Massachusetts: Wellesley (Bost. Mus. Nat. Hist.), 1 male.

PLATE XCIII

Sigara Vermicorixa Walton

Fig. 1. *Sigara (Vermicorixa) mckinstryi* n. sp ; front leg of male.
Fig. 1a. Genital capsule of male.
Fig. 1b. Dorsal view of male abdomen.
Fig. 2. *Sigara (Vermicorixa) alternata* (Say); front leg of male.
Fig. 2a. Genital capsule of male.
Fig. 2b. Dorsal view of male abdomen.
Fig. 3. *Sigara (Vermicorixa) mathesoni* n. sp.; front leg of male.
Fig. 3a. Genital capsule of male.
Fig. 3b. Dorsal view of male abdomen.
Fig. 4. *Sigara (Vermicorixa) washingtonensis* n. sp.; front leg of male.
Fig 4a. Genital capsule of male.
Fig. 4b. Dorsal view of male abdomen.
Fig. 5. *Sigara (Vermicorixa) vandykei* n. sp ; front leg of male.
Fig 5a. Genital capsule of male.
Fig. 5b. Dorsal view of male abdomen.
Fig. 6. *Sigara (Vermicorixa) grossolineata* n. sp.; front leg of male
Fig 6a. Genital capsule of male.
Fig 6b. Dorsal view of male abdomen.

PLATE XCIII

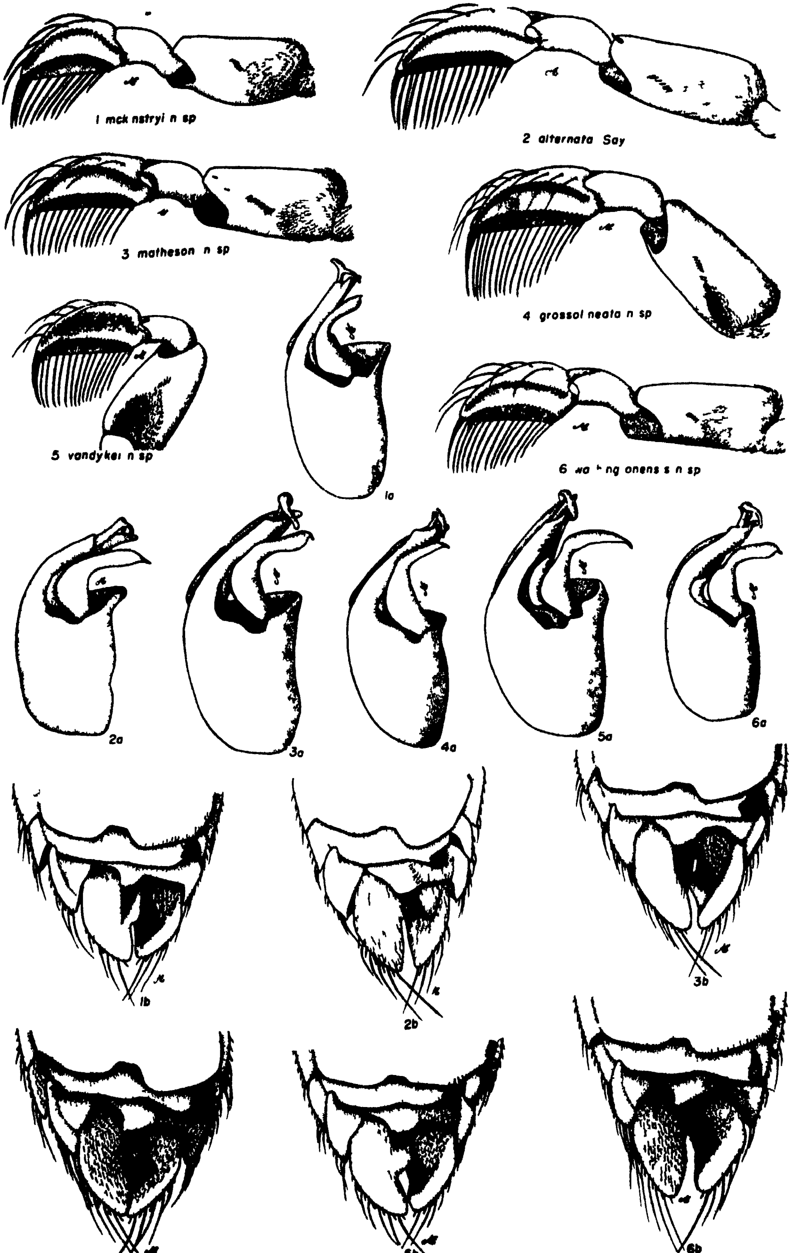
1 mckinstryi n sp
2 alternata Say
3 mathesoni n sp
4 grossolineata n sp
5 vandykei n sp
1a
6 washingtonensis n sp
2a
3a
4a
5a
6a
1b
2b
3b
4b
5b
6b

PLATE XCIV

Sigara Vermicorixa Walton

FIG. 1. *Sigara* (*Vermicorixa*) *modesta* (Abbott); right clasper, Putnam, N. Y.

FIG. 2. *Sigara* (*Vermicorixa*) *stigmatica* (Fieber)*; right clasper, Putnam, N. Y.

FIG. 3. *Sigara* (*Vermicorixa*) *grossolineata* n. sp.; right clasper, Ft. Collins, Colo.

FIG. 4. *Sigara* (*V.*) *modesta* (Abbt.); pala of male, Mass.

FIG. 5. *S.* (*V.*) *grossolineata* n. sp.; male pala, Ames, Iowa.

FIG. 6. *S.* (*V.*) *grossolineata* n. sp.; right clasper, Ottawa, Ont.

FIG. 7. *S.* (*V.*) *modesta* (Abbt.); right clasper, Mass.

FIG. 8. *S.* (*V.*) *modesta* (Abbt.); right clasper, Kerrville, Tex.

FIG. 9. *S.* (*V.*) *virginiensis* n. sp.; male pala, Philadelphia, Pa.

FIG. 10. *S.* (*V.*) *grossolineata* n. sp.; male pala, Ottawa, Ont.

FIG. 11. *S.* (*V.*) *grossolineata* n. sp.; male pala, Ft. Collins, Colo.

FIG. 12. *S.* (*V.*) *grossolineata* n. sp.; right clasper, Ames, Iowa.

FIG. 13. *S.* (*V.*) *modesta* (Abbt.); front leg of male, paratype, Plummer's Island, Md.

FIG. 14. *S.* (*V.*) *modesta* (Abbt.); male pala, Kerrville, Tex.

FIG. 15. *S.* (*V.*) *virginiensis* n. sp.; right clasper, Philadelphia, Pa.

FIG. 16. *S.* (*V.*) *modesta* (Abbt.); male pala, Putnam, N. Y.

FIG. 17. *S.* (*V.*) *stigmatica* (Fieber); front leg of male, type, "North America."

FIG. 18. *S.* (*V.*) *modesta* (Abbt.); right clasper, Philadelphia, Pa.

FIG. 19. *S.* (*V.*) *stigmatica* (Fieb.)*; pala of male, Putnam, N. Y.

FIG. 20. *S.* (*V.*) *modesta* (Abbt.); male pala, Philadelphia, Pa.

FIG. 21. *S.* (*V.*) *modesta* (Abbt.); dorsum of male abdomen, paratype, Plummer's Island, Md.

FIG. 22. *S.* (*V.*) *modesta* (Abbt.); genital capsule, paratype, Plummer's Island, Md.

FIG. 23. *S.* (*V.*) *stigmatica* (Fieb.); genital capsule, type, "N. A."

FIG. 24. *S.* (*V.*) *virginiensis* n. sp.; Warrentown, Va., genital capsule.

FIG. 25. *S.* (*V.*) *washingtonensis* n. sp.; genital capsule, Adams Lake, B. C.

FIG. 26. *S.* (*V.*) *virginiensis* n. sp.; dorsum of male abdomen, Philadelphia, Pa.

FIG 27. *S.* (*V.*) *stigmatica* (Fieb.); dorsum of male abdomen, "North America."

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* This specimen has a pala which is nearer to *S.* (*V.*) *stigmatica* (Fieb.) than anything else which we have encountered. We have called it *stigmatica*, but it may well be merely a variation of *modesta* (Abbt.). Certainly the number of pegs on the pala is unlike that of the type of *stigmatica*.

PLATE XCIV

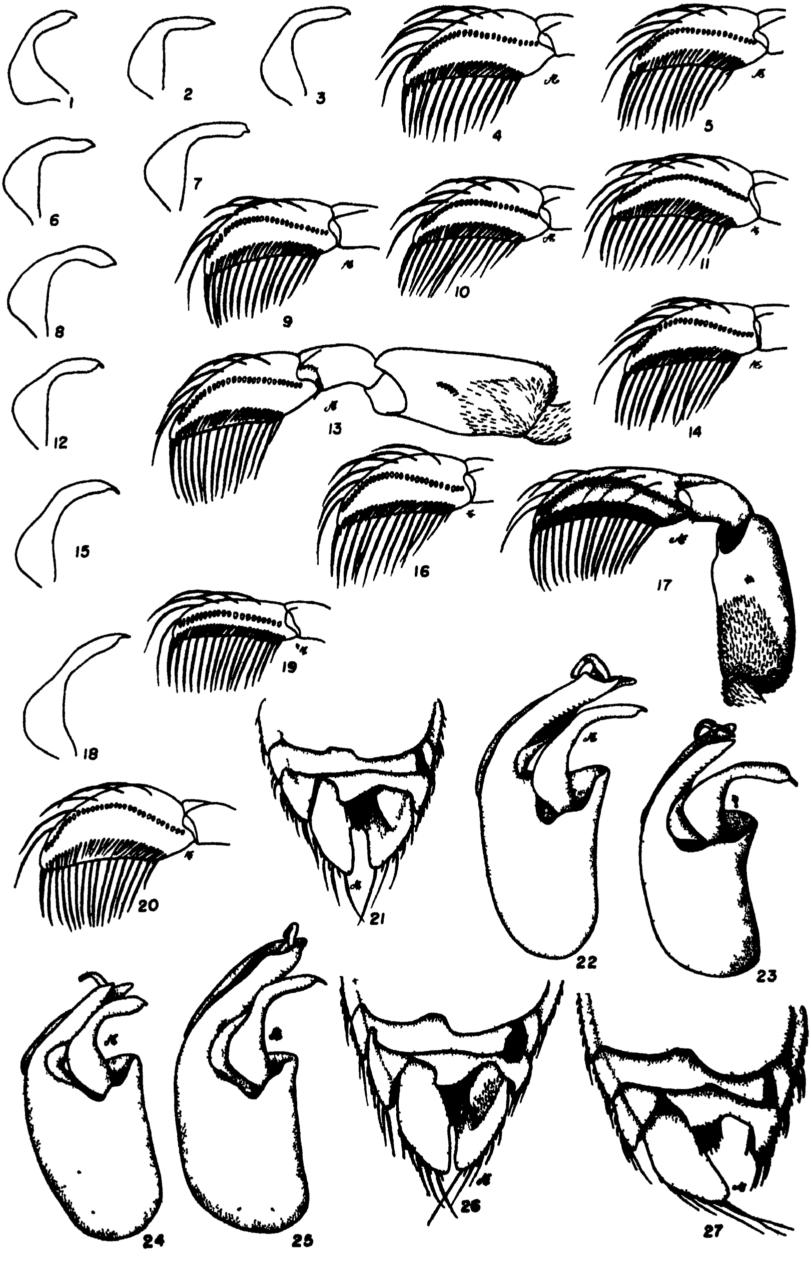


PLATE XCV

Sigara Vermicorixa Walton

FIG. 1. *Sigara (Vermicorixa) knighti* n sp ; dorsal view of male abdomen

FIG. 1a. Genital capsule of male.

FIG. 1b. Pala of male.

FIG. 2. *Sigara (Vermicorixa) mullettensis* (Hungerford); dorsal view of male abdomen.

FIG 2a. Genital capsule of male.

FIG. 2b. Pala of male.

FIG. 3. *Sigara (Vermicorixa) solensis* (Hungerford); dorsal view of male abdomen.

FIG. 3a. Genital capsule of male.

FIG. 3b. Pala of male.

FIG. 4. *Sigara (Vermicorixa) transfigurata* (Walley); dorsal view of male abdomen.

FIG. 4a. Genital capsule of male.

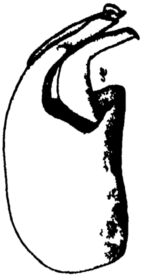
FIG. 4b. Pala of male.

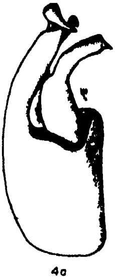
FIG. 5. *Sigara (Vermicorixa) johnstoni* n. sp.; dorsal view of male abdomen.

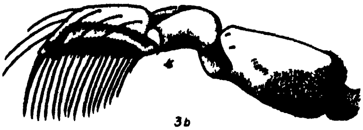
FIG. 5a. Genital capsule of male.

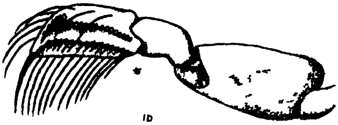
FIG. 5b. Pala of male.

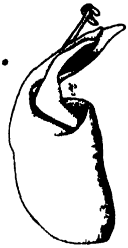
PLATE XCV

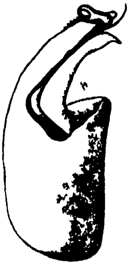

5a

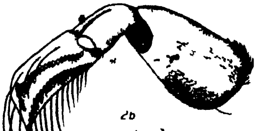

4a

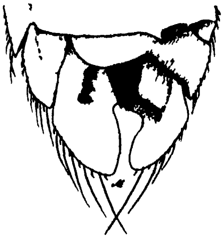

3b

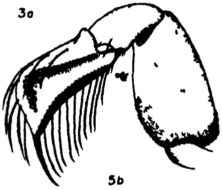

1b

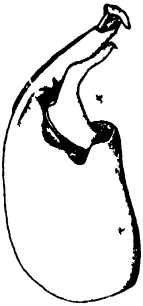

2a

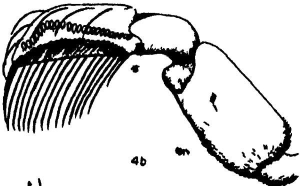

3a

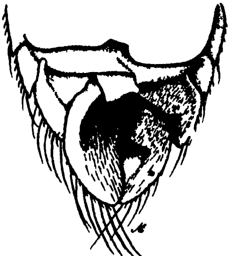

2b

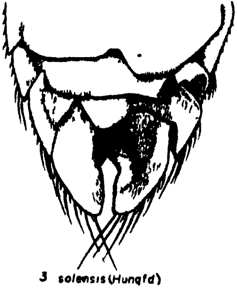

1 knighti n sp

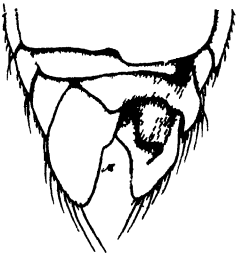

5b


1a


4b


2 mullettensis (Hungfd)


3 solensis (Hungfd)


4 transfigurata (Walley)

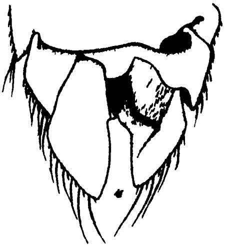

5 johnstoni n sp

PLATE XCVI

Sigara Vermicorixa Walton

FIG. 1. *Sigara (Vermicorixa) hubbelli* (Hungerford); dorsal view of male abdomen.
FIG. 1a. Metaxyphus.
FIG. 1b. Pronotal disk of male.
FIG. 1c. Head of male.
FIG. 1d. Genital capsule of male.
FIG. 1e. Pala of male.
FIG. 2. *Sigara (Vermicorixa) defecta* n. sp.; dorsal view of male abdomen.
FIG. 2a. Metaxyphus.
FIG. 2b. Pronotal disk of male.
FIG. 2c. Head of male.
FIG. 2d. Genital capsule of male.
FIG. 2e. Pala of male.
FIG. 3. *Sigara (Vermicorixa) cubiensis* n. sp.; dorsal view of male abdomen.
FIG. 3a Pala of male.
FIG. 3b. Genital capsule of male.
FIG. 4. *Sigara (Phaeosigara) quebecensis** (Walley); dorsal view of male abdomen.
FIG. 4a. Pala of male.
FIG. 4b. Genital capsule of male.
FIG. 5 *Sigara (Vermicorixa) omani* (Hungerford); dorsal view of male abdomen.
FIG. 5a. Pala of male.
FIG. 5b. Genital capsule of male.
FIG. 6. *Sigara (Vermicorixa) nevadensis* (Walley); dorsal view of male abdomen.
FIG. 6a. Pala of male.
FIG. 6b. Genital capsule of male.

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* *S. (P.) quebecensis* (Walley) was at first believed to be related to this group, but subsequent checking of characters has led us to place it with *signata* (Fieber) and allied species.

PLATE XCVI

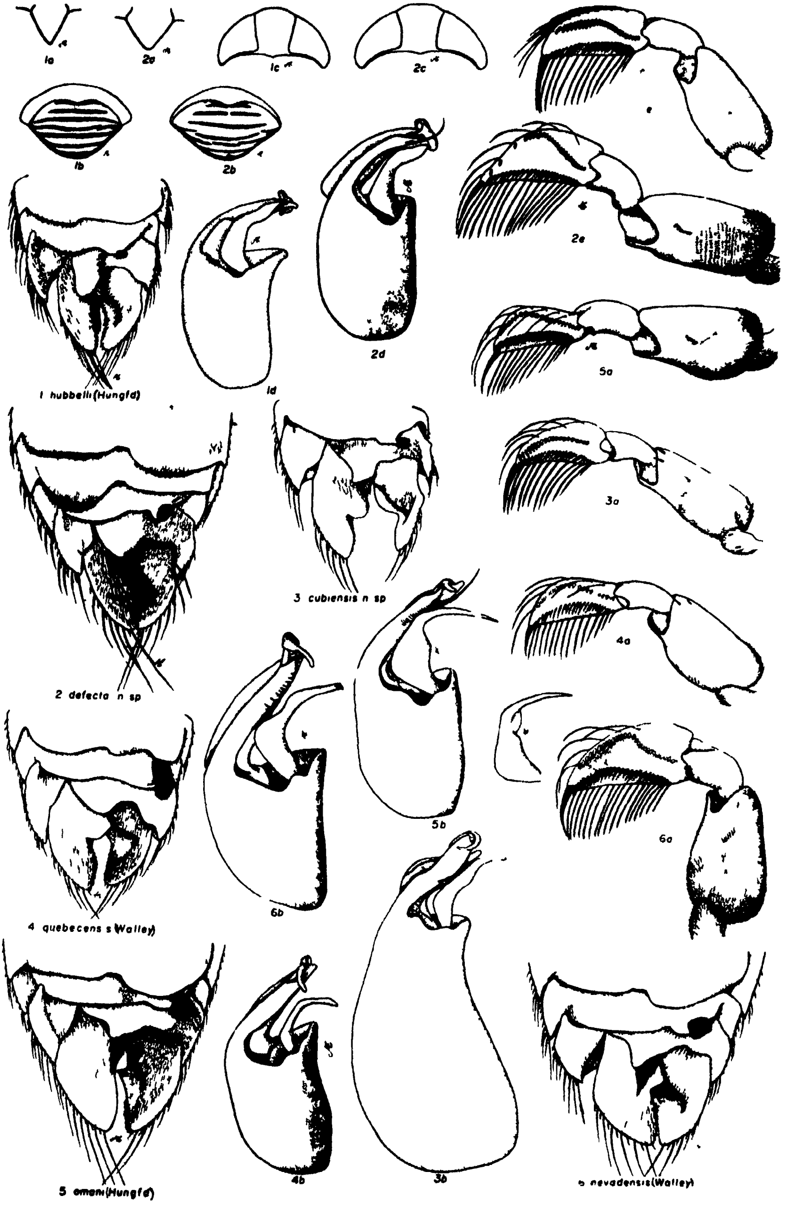

1a
2a
1c
2c
1b
2b
2d
2e
1 hubbelli (Hungfd)
1d
5a
3a
3 cubiensis n sp
2 defecta n sp
4a
5b
6a
4 quebecensis (Walley)
6b
5 omani (Hungfd)
4b
3b
6 nevadensis (Walley)

PLATE XCVII

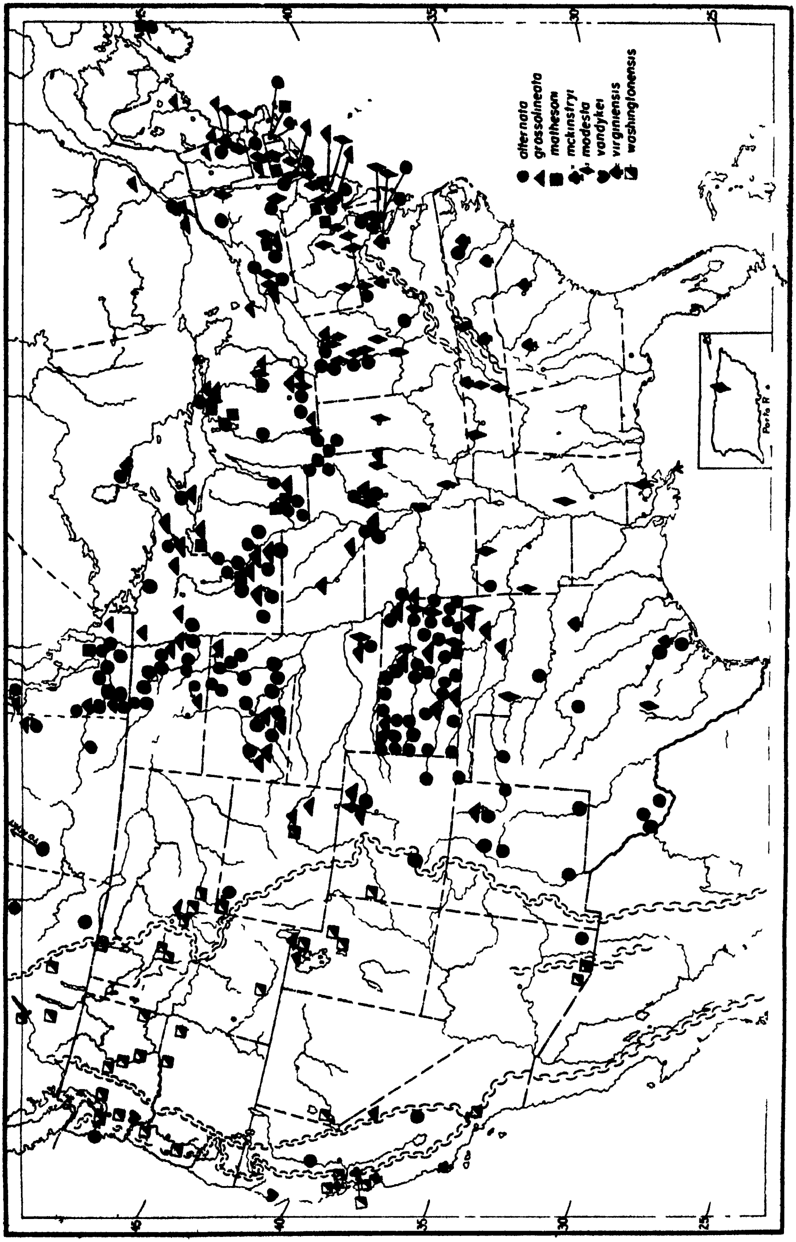

● alternata
▲ grossolineata
■ mathesoni
◆ mckinstryi
◆ modesta
◆ vandykei
◆ virginiensis
◩ washingtonensis
Porto R.
45
40
35
30
25

PLATE XCVIII

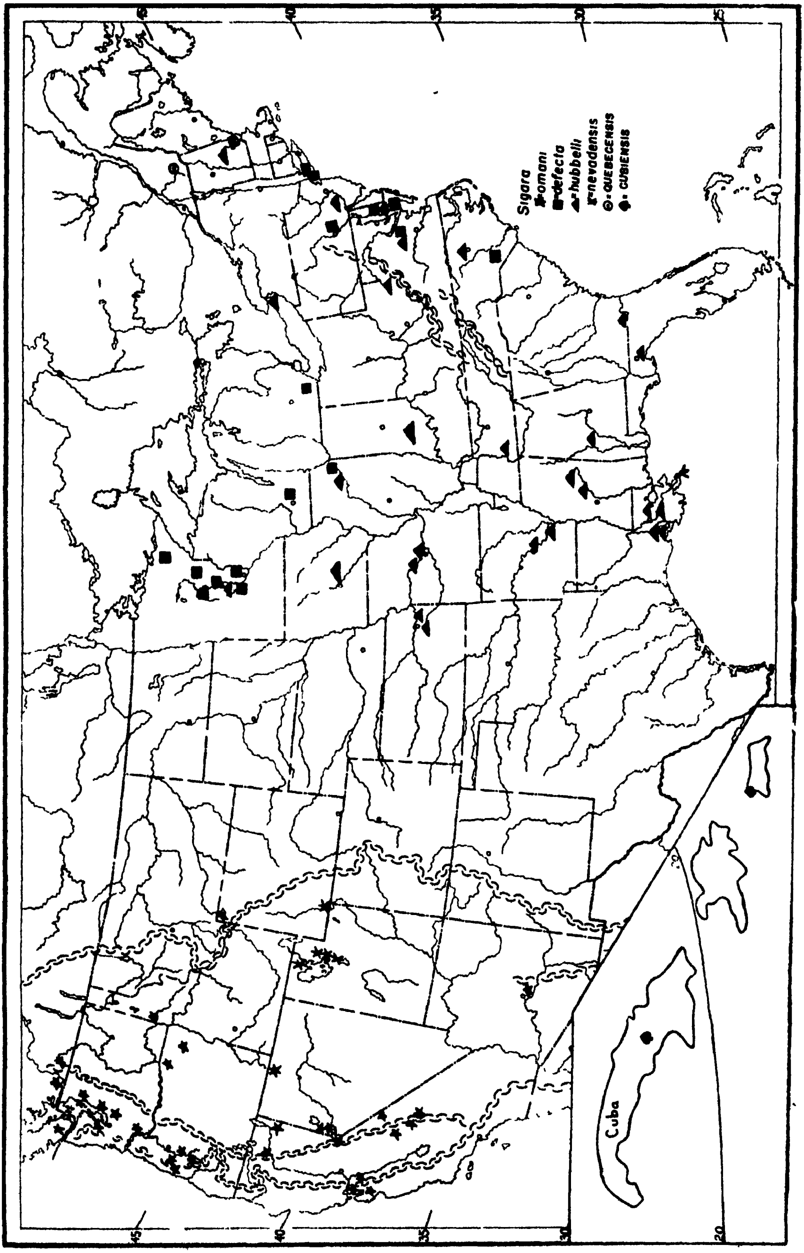
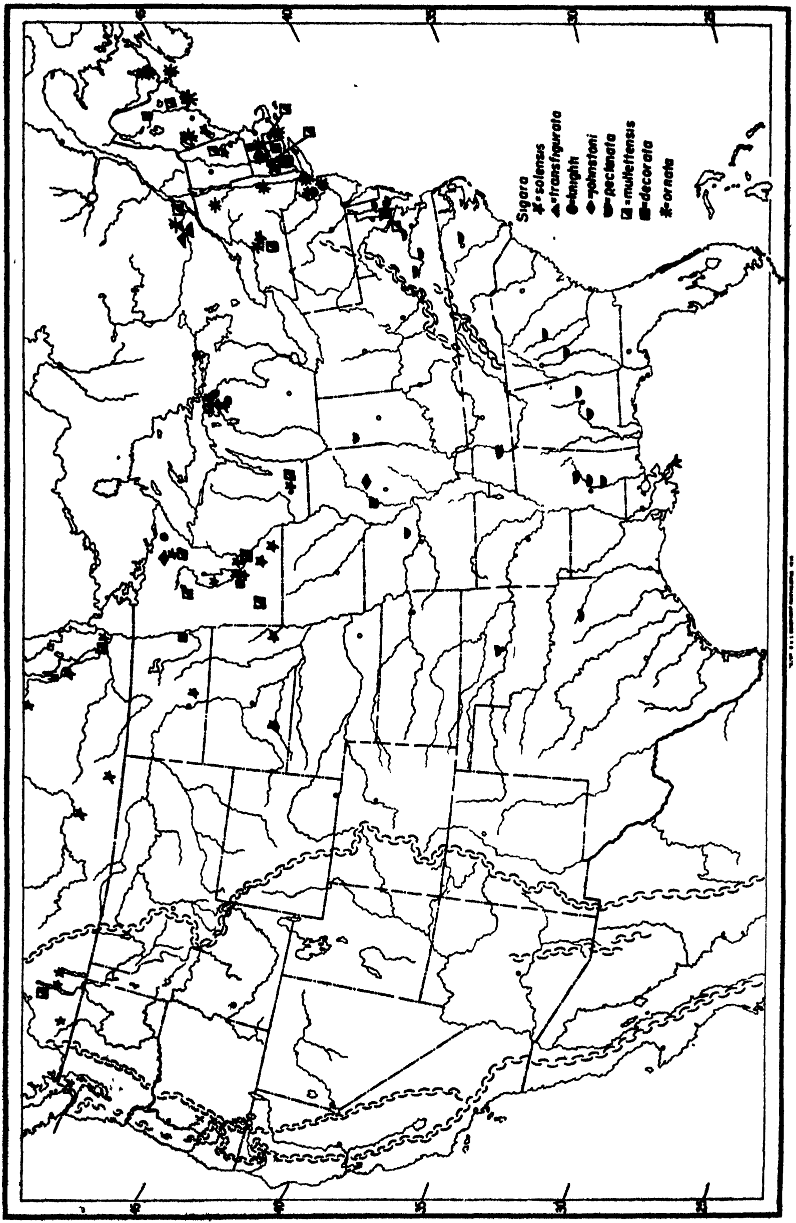


PLATE XCIX


45
40
35
30
25
Sigara
★=solensis
▲=transfigurata
●=knighti
◆=johnstoni
▼=pectinata
◪=mullettensis
■=decorata
✱=ornata

Subgenus *Phaeosigara* new

A group of small species, typified by *S. signata* (Fieb.). They have a narrow interocular space, the rear margin of the head medianly produced and carinate. Hemelytral pattern with pale figures usually reduced, broken and irregular in shape, often in faint longitudinal series. The males have the right clasper of bizarre shape and the female pala has the dorsal margin depressed before the tip or the space between dorsal margin and upper palmar row narrow.

Subgenotype: *Sigara signata* (Fieber).

Sigara (Phaeosigara) bradleyi (Abbott)

(Plate CI, figs. 1, 1a and 1b)

1913 *Arctocorisa bradleyi* Abbott, J. F. Bull. Brooklyn Ent. Soc. VIII, No. 6, pp. 83 and 88 (records Okefenokee Swamp, Blackshear, Cave Springs and Offerman, Georgia, and characterizes in his key).

1915. *Arctocorisa bradleyi*, Abbott, J. F Washington Univ. Studies, Vol. II (St. Louis, Mo.), pp. 84-86, Pl. XV, figs. 6 and 7 (description of new species and records from Georgia).

1917. *Arctocorixa bradleyi*, Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico, p. 479.

1926. *Arctocorixa bradleyi*, Blatchley, W S Heteroptera of Eastern North America, pp. 1078, 1075 (Georgia).

1926. *Arctocorixa abjecta* Blatchley, W. S. Heteroptera of Eastern North America, pp. 1073, 1075 (Dunedin, Fla.).

Size: Length 2.9 mm. to 3.6 mm. Width across eyes .96 mm. to 1.3 mm.

Color: General facies medium to dark. Pronotum crossed by 6 regular dark bands about the same width as the pale interspaces. Pattern of clavus and corium broken into many fragments of light and dark, the dark color predominating. Membrane separated from corium by palish line and pattern even more broken than that of corium. Embolium, head, limbs, and venter pale.

Structural characteristics: Head four-fifths as long as the pronotal disk; interocular space less than the width of an eye; vertex smoothly rounded in both sexes as seen from above; face not hairy; male fovea broad but shallow; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 12 : 8 : 20 : 10 ♂ ; 1 : 2 : 3 : 4 :: 14 : 8 : 22 : 12 ♀. Pronotal disk rounded laterally and apically, with faint median carina on anterior fourth; pronotum faintly rugulose; hemelytra smooth and shining, with a few scattered hairs. Lateral lobe of prothorax elongate, slightly constricted at base, anterior distal angle produced, tip obliquely truncate; mesoepimeron moderately broad, but with osteole nearer to tip than to lateral emargination; base of mesoepimeron inflated, almost concealing the lateral lobe of the prothorax; metaxyphus broader than long, tip blunt. Pala of female slightly depressed dorsally before apex. Front leg of male: pala cultrate, not carinate on dorsal margin, with 16 to 17 large pegs in a single, uninterrupted row; tibia slightly less than half as long as pala, without dorsal carina, and with a round, prominent pad; femur slender, with small patch of stout hairs on inner surface near base. Middle and hind legs slender; hind femur without spines on dorsal surface; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42.9 : 32.2 : 38.2; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 47 : 91.4 : 43.5. Male asymmetry dextral; strigil of moderate size, suboval, of 4 regular combs. Left anal lobe incised on inner dorsal margin. For details of male structures see Plate CI, figs. 1, 1a, and 1b. Female abdomen normal.

Comparative notes: This is one of the smallest species belonging to *Sigara*. It is less than 4 mm. long and is distinguished from *macrocepsoidea* by having a relatively larger pronotum with 6 bands.

Location of types: Holotype male and 3 female paratypes from Billy's Island, Okefenokee Swamp, Ga., June, 1912, in the Cornell Collection, Ithaca, N. Y. The type series of *A. abjecta* Blatchley are from Dunedin, Florida, and are in his collection. He sent me two cotypes which are in the Francis Huntington Snow Entomological Collection, University of Kansas.

Data on distribution: (Plate CIV.)

CUBA: Camaguey, Sept. 2, 1926, J. Acuna (from Bruner), 10 males, 34 females.

U. S. A.: *Florida:* Lamont, March 8, 1947, L. D. Beamer, 2 males, 5 females; Bunker Branch, Arcadia, March 30, 1938, J. C. Bradley, 2 females, 1 female nymph; Waldo, Aug. 18, 1930, P. W. Oman, 52 males, 26 females; Hilliard, Aug. 31, 1930, P. Oman, 19 males, 15 females; same place, Aug. 19, 1930, J. Nottingham, 91 males, 95 females; same place and date, L. D. Tuthill, 10 males, 8 females; same place, Aug. 31, 1930, R. H. Beamer, 1 male, 2 females; same place and collector, July 8, 1934, 11 males, 7 females; same place, Aug. 6, 1930, Beamer and Hardy, 5 males, 10 females; Ponce de Leon, July 28, 1934, R. H. Beamer, 1 male, 2 females; Ocala, Aug. 17, 1930, P. W. Oman, 3 males, 3 females; Wildwood, Aug. 2, 1930, J. Nottingham, 2 males, 1 female; Sebring, Aug. 5, 1930, same collector, 1 male; Ft. Myers, Aug. 14, 1930, R. H.

Beamer, 1 female; Likely, July 24, 1934, P. McKinstry, 3 females; Wakulla Springs, July 14, 1934, Beamer and McKinstry, 3 males; Loughman, July 20, 1930, P. W. Oman, 1 female; Lake Jovita, July 20, 1934, Beamer and McKinstry, 3 males, 7 females; Archer, July 31, 1930, Beamer and Oman, 19 males, 15 females; Childs, Aug. 6, 1930, same collectors, 10 males, 6 females; Yankeetown, July 31, 1930, Beamer and Nottingham, 3 females; same place, July 17, 1934, P. McKinstry, 1 female; Ft. Mead, Aug. 13, 1930, P. W. Oman, 1 female; Orange Co., Jan. 10, 1938, H. B. Hungerford, 5 males, 4 females; Lacooche, Aug. 10, 1930, P. W. Oman, 5 males, 5 females; Wakullah, July 10-11, 1939, Beamer and Lawson, 5 males, 1 female; Old Town, July 11, 1939, same collectors, 8 males, 26 females; La Belle, July 16, 1939, E. G. Wegenek, 2 females; same place and date, P. B. Lawson, 3 males, 1 female; same place and date, D. E. Hardy, 1 male; same place and date, R. H. Beamer, 2 males, 3 females; Plant City, Aug. 15, 1930, Nottingham and Oman, 2 males; same place, June 10, 1926, C. O. Bare, 1 male, 1 female; Daytona Beach, July 22, 1939, R. H. Beamer, 1 male, 1 female; Dunedin, Feb. 12, 1922, W. S. G., 2 males, 1 female; Eridn, July 11, 1939, P. B. Lawson, 1 male, 1 female; Cedar Keys, July 12. 1939, Lawson and Beamer, 1 male, 2 females; Lake City, Aug. 5, 1939, R. H. Beamer, 2 males, 5 females; Starke, Aug. 7, 1939, J. D. Beamer, 2 males, 4 females; De Land, Aug. 8, 1939, J. D. Beamer, 3 males, 1 female; Dunnellon, July 12, 1939, Beamer and Lawson, 7 males, 1 female; Sanford, Aug. 4, 1930, P. W. Oman, 2 females; same place, Aug. 8, 1939, Beamer and Hardy, 1 male, 8 females; same place, Aug. 22, 1933, C. O. Bare, 3 males, 1 female; Branford, Aug. 4, 1939, Beamer and Hardy, 13 males, 10 females; same place, July 16, 1934, R. H. Beamer, 1 female; Orlando, Jan. 10-12, 1938, H. B. Hungerford, 13 males, 7 females; nr. Orlando, Jan. 10-12, 1938, same collector, 3 males, 10 females; Gainesville, Dec. 14, 1937, same collector, 4 females.

Georgia: Okefenokee Swamp, July 30, 1934, R. H. Beamer, 33 males, 62 females; same place and collector, Aug. 3, 1934, 7 males, 8 females; same place and date, J. D. Beamer, 1 male; same place and date, R. H. Beamer, Jr., 1 male; same place and date, M. E. Griffith, 6 males, 8 females; same place and date, P. A. McKinstry, 6 males, 6 females; same place, July 27, 1939, R. H. Beamer, 4 males, 9 females; same place, July 25, 1939, R. H. Beamer, 12 males, 4 females; same plate and date, J. D. Beamer, 13 males, 3 females; same place and date, P. B. Lawson, 1 male;

same place and date, E. G. Wegenek, 2 males, 3 females; same place, Billy's Island, Dec. 26, 1913, 9 males, 3 females; Tifton, Aug. 11, 1939, D. E. Hardy, 1 male; Satilla R., Offerman, April 22, 1911, J. C. Bradley (Cornell Coll.), 1 female; Folkston, Aug. 2, 1934, R. H. Beamer, 1 female; Brantley Co., Jan. 3, 1947, L. W. Morgan, 6 males, 8 females; Blackshear, May 10, 1911, 1 male (paratype).

Alabama: Grand Bay, July 11, 1934, Beamer and McKinstry, 20 males, 15 females.

Mississippi: Fulton, July 14, 1930, P. W. Oman, 1 male; Waveland, July 9, 1934, P. McKinstry, 1 male.

Sigara (Phaeosigara) sigmoidea (Abbott)

(Plate CI, figs. 2, 2a and 2b)

1913. *Arctocorisa sigmoidea* Abbott, J. F. Bull. Brooklyn Ent. Soc., VIII, p. 83-89, 91 (Georgia). (Characterized in keys.)

1915. *Arctocorisa sigmoidea* Abbott, J. F. Wash. Univ Studies, Vol. II, pp. 82-83, Pl. XV, figs. 4 and 8 (Georgia).

1926. *Arctocorixa sigmoidea,* Blatchley, W. S. Heteroptera of Eastern North America, p. 1080 (Georgia).

Size: Length 4.1 mm. to 4.5 mm. Width across eyes 1.3 to 1.4 mm.

Color: General facies dark with small flecks of pale color. Pronotum crossed by 8 broad dark bands and 7 narrow pale lines. Clavus and corium dark, with pale flecks scattered about; outer distal angle of corium pale as in *S. signata* (Fieb.). Membrane and corium separated by indistinct palish line; pattern like that of corium except pale areas a little larger. Embolium, head and limbs pale; venter pale to smoky.

Structural characteristics: Head of male nearly three-fourths as long as pronotal disk, that of female two-thirds as long; interocular space narrow, about half as broad as the width of an eye; vertex smoothly rounded in both sexes as seen from above; face not hairy; male fovea oval, shallow, and narrow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 13 : 10 : 25 : 15 ♂; 1 : 2 : 3 : 4 :: 13 : 10 : 28 : 15 ♀. Pronotal disk rounded laterally and apically, with median carina faintly visible on anterior third; pronotum finely rastrate; hemelytra faintly rugulose with occasional pale hairs. Lateral lobe of prothorax long and tongue-shaped; base of mesoepimeron inflated, often almost concealing the prothoracic lobe; mesoepimeron moderately broad, but osteole nearer to tip than to lateral bend; metaxyphus considerably broader than long, margins often forming a little more than a right angle apically. Front leg of female: pala depressed dorsally near apex. Front leg of male: pala broad with dorsal margin sigmoid, not carinate basally, with 7 distal pegs longer than the basal pegs which number 12 to 15. See Plate CI, fig. 2a. Tibia about half as long as pala, with pronounced carina which projects laterally as seen in dorsal view; femur slender with patch of stridulatory pegs on inner surface, arranged in about 12 rows. Middle and hind legs long and slender; hind femur with row of spines distally on dorsal inner margin; proportions as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.7 : 29.8 : 44.7. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 75 : 96.4 : 35.7. Male asymmetry dextral; strigil small, elongate, of 7 regular combs. Right margin of seventh abdominal segment laterally produced. Inner dorsal margin of left anal lobe incised. For details of male structures see Plate CI, figs. 2, 2a and 2b Female abdomen normal.

Comparative notes: This species runs out in the key with *S.* (*P.*) *zimmermanni* (Fieb.) from which it may be separated by the row of short spines on the dorsal inner (or posterior) margin of the hind femur.

Location of types: Cornell Collection, Ithaca, N. Y., has lectotype male and 3 male and 4 female paratypes from Billy's Island, Okefenokee Swamp, Ga., June, 1912. One pair of these has been placed in the Francis Huntington Snow Entomological Museum, University of Kansas.

Data on distribution: (Plate CIV.)

Florida: Hilliard, Aug. 31, 1930, P. W. Oman, 41 males, 3 females; same place, July 28, 1934, R. H. Beamer, 40 males, 120 females; Dunedin, March 20, 1927, W. S. Blatchley (Lutz Coll.), 2 males (labeled "autotype *A. abjecta* Blatchley, Oct. 18, 1936"); Punta Gorda, March 23, 1941, H. Ramstadt (Field Mus. Coll.), 1 female; Wildwood, Aug. 2, 1930, J. O. Nottingham, 3 females; same place and date, P. W. Oman, 4 males, 1 female; same place and date, R. H. Beamer, 4 males, 1 female; Ponce de Leon, July 13, 1934, R. H. Beamer, 2 males, 5 females; Coconut Grove, Aug. 9, 1930, P. W. Oman, 4 females; Loughman, Aug. 4, 1930, R. H. Beamer, 1 female; Sanford, Aug. 4, 1930, P. W. Oman, 10 males, 27 females; same place, Aug. 8, 1939, J. D. Beamer, 1 male, 2 females; Plant City, Jan. 4, 1927, C. O. Bare, 2 males; same place, Aug. 15, 1930, P. W. Oman, 1 female; same place, July 27, 1926,

C. O. Bare, 7 males, 8 females; Wakulla Springs, July 14, 1934, R. H. Beamer, 5 males, 8 females; same place and date, P. McKinstry, 6 males, 6 females; Lake Jovita, July 20, 1934, Beamer and McKinstry, 9 males, 18 females; Lakeland, Nov. 10, 1911 (Am. Mus. Nat. Hist.) 3 males, 5 females; Gainesville, Dec. 14, 1937, H. B. Hungerford, 2 males; Old Town, Aug. 10, 1939, R. H. Beamer, 1 male; De Land, Aug. 8, 1939, J. D. Beamer, 6 males, 3 females; Waldo, Aug. 18, 1930, P. W. Oman, 3 males; Lacoochee, Aug. 9, 1939, J. D. Beamer, 4 males, 4 females; Starke, Aug. 7, 1939, J. D. Beamer, 13 males, 7 females; La Belle, July 16, 1939, J. D. Beamer, 1 male, 2 females; Gainesville, 1914 (Am. Mus. Nat. Hist.), 1 male, 1 female; Fort Myers, Nov. 10, 1911 (Am. Mus. Nat. Hist.), 1 female; Titusville, Nov. 8, 1911 (Am. Mus. Nat. Hist.), 3 females; Jacksonville (Cornell), 1 male.

Georgia: Baker Co., Dec. 23, 1946, L. W. Morgan, 2 males, 1 female; Brantley Co., Jan. 3, 1947, L. W. Morgan, 6 males, 12 females; Okefenokee Swamp, July 25, 1939, R. H. Beamer, 13 males, 10 females; same place, July 27, 1939, J. D. Beamer, 10 males, 10 females; same place, July 25, 1939, E. G. Wegenek, 1 male, 2 females; same place, July 30, 1934, P. McKinstry, 65 males, 70 females; same place and date, M. E. Griffith, 32 males, 69 females; same place, Mixon's Hump, June 16, 1912, 1 male, 1 female; same place, Billy's Island, June, 1912, 1 female; Blackshear, May 10, 1911, J. C. Bradley, 2 females; Thomasville, Aug. 28, 1927, C. H. Martin, 1 female.

North Carolina: Southern Pines, March 13, 1916, A. H. Manee, 1 male, 3 females (Parshley Coll.).

Sigara (*Phaeosigara*) *zimmermanni* (Fieber)
(= *compressa* Abbott)

(Plate CI, figs. 3-3c)

1851. *Corisa zimmermanni* Fieber, F. X. Species Generis Corisa, p. 21; Pl. 1, fig. 18 (Pennsylvania, "Carolina").

1909 *Arctocorisa zimmermanni*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc. Ent. Soc. Wash., X, p. 197.

1913. *Arctocorisa compressa* Abbott, J. F. Bull. Brooklyn Ent. Soc., VIII, pp. 88, 88, 91, Pl. fig. 6 (Georgia). Characterised in keys.

1915. *Arctocorisa compressa*, Abbott, J F. Wash. Univ. Studies (St. Louis, Mo.), II, pp. 81-82, Pl. XV, figs. 1-3 (Georgia).

1917. *Arctocorisa compressa*, Parshley, H. M. Occasional Papers of the Boston Soc. Nat. Hist., VII, p. 118.

1917. *Arctocorixa compressa*, Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico, p. 479.

1917. *Arctocorixa zimmermanni*, Van Duzee, E. P. Catalogue of the Hemiptera of America North of Mexico, p. 485.

1922. *Arctocorixa compressa*, Drake, Carl J. Tech. Pub. No. 16, New York State College of Forestry at Syracuse University, p. 86. [This is *S. signata* (Fieb.).]

1923. *Arctocorisa compressa*, Abbott, J. F., *in* "Guide to the Insects of Connecticut," Part IV, "The Hemiptera or Sucking Insects of Connecticut," p. 890, fig. 36 (15); (Hamden, Conn., Southern States).

1926. *Arctocorixa compressa*, Blatchley, W. S. Heteroptera of Eastern North America, p. 1078 (Connecticut, Georgia).

1928. *Arctocorisa compressa*, Torre-Bueno, J. R. de la, *in* "A List of the Insects of New York," Cornell Univ. Exp. Sta. Memoir 101, p. 141 (Cranberry Lake, N. Y.). This is Drake's record and is *S. signata* (Fieb.).

1929. *Sigara zimmermanni*, Lundblad, O. Archiv. für Hydrobiologie, Bd. XX, p. 310, Pl. XI, fig. 4 (hemelytron of ♀ type).

1929. *Sigara zimmermanni*, Lundblad, O. "Zoologischer Anzeiger," Bd. 80, Heft 7/9, pp. 201-204, text figs 12-15; (redescription).

1931. *Sigara zimmermanni*, Lundblad, O. "Zoologischer Anzeiger," Bd. 96, Heft 3/4, p. 87 (allotype ♀ in Berlin Mus. and holotype ♂ in Halle Mus.).

1936 *Arctocorixa zimmermanni*, Walley, G. S. Canadian Entomologist, LXVIII, p. 60 (Georgia and South Carolina). (Says *A. compressa* Abbott is synonym.)

1938. *Arctocorixa compressa*, Brimley, C. S. Insects of North Carolina, p. 84.

Size: Length 4.5 mm. to 5 mm. Width across eyes 1.5 mm. to 1.6 mm.

Color: General facies dark. Pale markings often scarcely discernible because they may be nearly as dark as the brown figures. On pronotum 7 to 9 dark brown bands; on clavus and corium paler figures are obscure mottlings with no definite arrangement but faintly longitudinal; a pale area at outer apical angle of corium; membranal suture indefinite, pattern obscure. Embolium grayish yellow as are head, limbs and venter.

Structural characteristics: Head two-thirds to three-fourths as long as pronotal disk, the rear margin medianly produced, carinate and punctate; postocular space broadest at inner angles of eyes, rear margins of eyes almost straight; interocular space narrower than the width of an eye; vertex smoothly rounded as seen from above; male fovea scarcely discernible, face merely slightly flattened; antennal segmentation: 1 : 2 : 3 : 4 :: 16 : 11 : 30 : 22 ♂; 1 : 2 : 3 : 4 :: 16 : 12 : 30 : 22 ♀. Pronotal disk rounded laterally, slightly pointed distally; median carina on anterior third; pronotum finely and hemelytra but lightly rastrate, the latter with scattered pale hairs. Lateral lobe of prothorax elongate, tip obliquely truncate to rounded; mesoepimeron narrow, osteole near tip; metaxyphus slightly broader than long, sides narrowing toward tip. Front leg of female with dorsal margin of pala depressed. Front leg of male: pala sinuous as seen in dorsal view, not carinate on dorsal margin, peg row curving from base toward dorsal margin and following it to apex, consisting of 20 pegs; tibia not quite half as long as pala, with no dorsal carina and a very thin pad; femur slender with about 9 rows of stridulatory teeth on inner surface. Middle and hind legs slender; hind femur without dorsal spines and under side more than half pilose; the comparative measurements of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42 : 30 : 40. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 79.9 : 111.2 : 38.9. Male asymmetry dextral; strigil small, elongate, of 5 regular combs. Right tergite of seventh abdominal segment long, reaching almost as far caudad as tips of anal lobes, right margin with a lateral projection. For details of male structures see Plate CI, figs. 3, 3a, 3b, and 3c. Female abdomen normal.

Comparative notes: A little larger than *S.* (*P.*) *sigmoidea* (Abbott) and its pattern less definite.

Location of types: Fieber's types in the museum at Halle, Germany, and Berlin Museum. They came from "Pennsylvania" and "Carolina" (Zimmermann. Mus. Hal. ! et Coll. Germ.). These I have studied. Abbott's types, four males and four females from Mixon's Hammock, Ga., in the Cornell Collection, Ithaca, N. Y. Two of the paratypes now in the Francis Huntington Snow Entomological Museum, University of Kansas.

Data on distribution: (Plate CIV.)

Texas: (Uhler Coll.), 6 males, 5 females.

Mississippi: Beaumont, April 19, 1932, H. Dietrich (U. S. N. M.), 8 males, 14 females.

Alabama: Grand Bay, July 11, 1934, R. H. Beamer, 1 male, 1 female.

Florida: Waldo, Aug. 18, 1930, P. W. Oman, 24 males; Hilliard, Aug. 31, 1930, same collector, 20 males, 1 female; same place and date, R. H. Beamer, 1 male, 2 females; same place and collector, Aug. 28, 1934, 15 males, 19 females; same place, Aug. 19, 1930. J. Nottingham, 1 female; Suwanee Springs, July 29, 1930, J. Nottingham, 1 female; Ponce de Leon, July 13, 1934, R. H. Beamer, 1 male, 5 females; Branford, July 16, 1934, R. H. Beamer, 1 female; Gainesville, July 14, 1918, C. J. Drake (Drake); Lamont, March 8, 1947, L. D. Beamer, 1 male, 5 females; E. Florida, Ashmead, 1 female.

Georgia: Folkston, Aug. 2, 1934, R. H. Beamer, 3 males, 4 females; Okefenokee Swamp, Aug., 1934, same collector, 1 male, 1 female; same place, Aug. 30, 1934, J. D. Beamer, 1 male; same place, Aug., 1934, McKinstry and Griffith, 3 males, 8 females; same place, July 25, 1939, R. H. Beamer, 27 males, 26 females; same place, June 16, 1912 (Cornell U. Coll.), 3 males, 1 female; Blackshear, May 10, 1911 (Cornell Coll.), 2 males, 1 female; Okefenokee Swamp, Dec. 26, 1913 (Abbott Coll.), 1 male.

South Carolina: Bennettsville, Nov. 17, 1931, O. L. Cartwright (S. C. Exp. Sta. Coll.), 1 female.

North Carolina: Raleigh, December (Abbott Coll.), 2 males, 8 females; Southern Pines, Aug. 15, 1916, A. H. Manee (U. S. N. M.), 1 male, 1 female; Raleigh, Dec., 1 male; Hendersonville, July, 1907, F. Sherman, 1 male.

Virginia: Norfolk Co., May 11, 1911, G. E. Gould (U. S. N. M.), 1 male.

Washington, D. C.: March, 1910 (O. Heidemann, Cornell U.), 1 male.

Pennsylvania: Castle Rock, July 18, 1941, J. C. Lutz, 1 male, 1 female.

New York: White Plains, Sept. 13, 1919 (Torre-Bueno), 1 male, 2 females.

Connecticut: Hamden, June 1, 1911, B. H. Walden, 1 male.

Massachusetts: Saugus, Aug. 22, 1914, H. M. Parshley (Parshley Coll.), 1 female; Northampton, Sept. 9, 1920, Louise Smith (Parshley Coll.), 1 male, 2 females; Sherborn, Sept. 7, 1916, C. A. Frost, 3 females; Framingham, May 2, 1915, same collector, 1 female.

Maine: Orono, July 15, 1910 (Cornell Coll.), 1 male (labeled by Abbott as a paratype of *A. seriata* Abbt.).

Ohio: Delaware, June 26, 1916, C. J. Drake (Drake).

Michigan: Ann Arbor, July 9, 1921, R. F. Hussey (Hussey Coll.), 1 male.

Sigara (Phaeosigara) variabilis (Hungerford)

(Text fig. 18; wash drawing No 36, Plate VI)

1926. *Arctocorixa variabolis** Hungerford, H. B., Bull Brooklyn Ent Soc, Vol. 21, pp. 198-199, figs. 2 and 7 (Michigan, New Brunswick).

1930. *Arctocorixa variabilis*, Walley, G. S, Can. Ent, Vol. LXII, No. 12, p. 281 (Ontario).

Size: Length 5.3 mm. to 5.9 mm. Width across eyes 1.7 mm. to 1.8 mm.

Color: General facies very dark, nearly black, the yellow bars almost obliterated; pronotum with 6 broad, dark bands with very narrow spaces between which are only a little lighter than dark bands; a pale median line down pronotum; a few pale, transverse mottlings on clavus and corium. Membrane separated from corium by a pale line, pattern dark with a few pale mottlings. Embolium and head smoky, limbs and thoracic venter pale; abdomen smoky to black.

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* Typographical error. Correctly spelled on type labels.

Structural characteristics: Head three-fourths as long as pronotal disk; interocular space narrower than the width of an eye; vertex projecting beyond curve of eyes as seen from above in both sexes; male fovea oval, shallow, not attaining eyes laterally; face not hairy; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 20 : 40 : 30 ♂ ; 1 : 2 : 3 : 4 :: 20 : 20 : 40 : 30 ♀ . Pronotal disk angulate laterally and apically, median carina on anterior third; pronotum and hemelytra moderately rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow longer than that of claval suture. Lateral lobe of prothorax elongate, narrow, tip obliquely truncate and slightly inflated; mesoepimeron narrow with osteole near tip; metaxyphus broader than long, tip blunt. Front leg of female of usual shape but with pala depressed on dorsal margin. Front leg of male: pala greatly thickened and carinate on outside, short in comparison to breadth, with row of 22 to 24 pegs curving apically; tibia three-fourths as long as pala, with short dorsal carina and no pad; femur slender with a pilose area on inner surface. Middle and hind legs slender; one or two rows of pegs on dorsal margin of hind femur; the proportion of segment to segment as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42.8 : 26.7 : 46.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 78.9 : 113.1 : 39.5. Male asymmetry dextral; strigil moderately large, oval, of 6 regular combs. For details of male structures see text fig. 18. Anal lobes of female not notched on inner ventral margins.

Comparative notes: The depression in the dorsal margin of the female pala places this species close to the *signata* group, but the structures of the male show considerable difference. The greatly thickened male pala is a distinctive character.

Location of types: Holotype male, allotype female, and 9 male and 3 female paratypes, labeled "Nigger Creek, Mullett Lake, near Topinabee, Michigan, July 30, 1925, H. B. Hungerford"; same place and collector, Aug. 4, 1925, 4 male and 1 female paratypes; the above series in the Francis Huntington Snow Entomological Collections. One male and 4 female paratypes from St. Croix R., N. B., Oct. 23, 1893, W. C. Kendall in the Cornell Collections, Ithaca, New York.

Data on distribution: (Plate CIV.)

CANADA: *New Brunswick:* See type series above.

Quebec: Fairy L, May 16, 1927 (Walley).

Ontario: Jock River, May 21, 1927 (Walley); Ottawa, April 16, 1927 (Walley).

U. S. A.: *Connecticut:* Hamden, June 1, 1911, B. H. Walden, 1 female; Tunvis, St. Forest near Mass. border, July 26, 1942 (Hutchinson); Storrs, Aug. 4, 1946, R. H. Beamer, 2 males, 2 females; also Aug. 13, 1946, 16 males, 9 females.

New Jersey: Iona, July 7, 1938, J. C. Lutz III (Lutz Coll.), 2 males, 1 female; Trenton, Sept., 1903 (Hussey), 1 female.

Washington, D. C.: O. Heidemann (Cornell U), 1 female.

Virginia: Vienna, Sept. 19, 1931, P. W. Oman, 3 males.

Illinois: Lake Forest, Oct. 11, 1906, 4 males, 7 females (Cornell).

Michigan: See type series above; Cheboygan Co., Aug. 2, 1934, H. B. Hungerford, 1 female; Douglas L., July, 1927, H. B. Hungerford, 1 female.

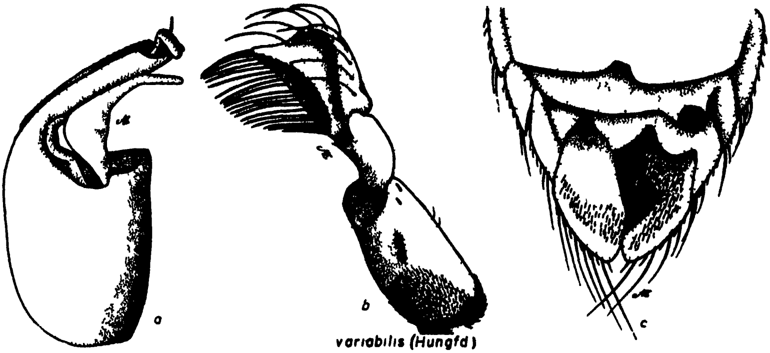

FIG. 18. *Sigara (Phaeosigara) variabilis* (Hungfd); (a) genital capsule of male; (b) front leg of male; (c) dorsal view of male abdomen

Sigara (Phaeosigara) compressoidea (Hungerford)

(Text fig 19)

1928 *Arctocorixa compressoidea* Hungerford, H B , Can Ent LX, p 226, Plate 18, figs 9 and 18 (Douglas Lake, Mich)

1936. *Arctocorixa compressoidea,* Walley, G S , Can Ent , Vol LXVIII, No 3, p 62 (records from Merivale, Ont)

Size: Length 5.2 mm. to 5.6 mm. Head width 1.6 mm. to 1.8 mm.

Color: General facies dark. Pronotum with transverse brown bands wider than pale interspaces; caudal pale spaces deeply impressed; dark bands interrupted down middle by a longitudinal pale band. Pale bands of clavus obliquely transverse and entire at base; apical ones slender, broken, and few in number. Pale lines of corium also slender and broken, sometimes only transverse dashes arranged in longitudinal series. Membrane smoky brown, pattern almost obliterated. Embolium reddish yellow to smoky. Limbs and venter pale; head usually pale with vertex darkened. Anal lobes of females sometimes tinged with red on ventral side.

Structural characteristics: Head two-thirds as long as pronotal disk; interocular space slightly less than or about equal to the width of an eye; vertex protruding slightly beyond curve of eyes as seen from above, especially in the male; faces of both sexes with a few long, pale hairs; male fovea oval, small, shallow; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 18 : 17 : 30 : 22 ♂ ; 1 : 2 : 3 : 4 :: 20 : 18 : 32 : 22 ♀ . Pronotal disk with lateral margins obliquely truncate, apex angulate; median carina on anterior fourth; pronotum and hemelytra strongly rastrate; a few scattered pale hairs on hemelytra; lateral lobe of prothorax elongate, sides parallel, tip rounded; thoracic region inflated, mesoepimeron moderately broad with osteole about half way between tip and lateral bend; metaxyphus broader than long, triangular, apex pointed. Female front leg with pala slightly depressed on distal dorsal margin. Front leg of male: pala curved inward as seen in dorsal view as in *S. zimmermanni* (Fieb.), distal pegs long and on an overhanging ledge, 20 to 22 pegs in a single row about midway between dorsal margin and palm, not carinate on outside; tibia two-thirds as long as pala, with only a very slight carina and no pad; femur relatively slender with about 12 rows of stridulatory teeth on inner surface arranged longitudinally. Middle and hind legs slender; hind femur with 1 to 3 spines dorsally; the proportions of segment to segment as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.5 : 30.9 : 41.9; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 80 : 100 : 42.9. Male asymmetry dextral; strigil large, oval, of 6 to 10 fairly regular combs. Right tergite of seventh abdominal segment large and long, extending more than half way down the edge of the right anal lobe. Male genital capsule with right clasper slightly notched at tip. For details of male structures see text fig. 19. Female abdomen normal.

Comparative notes: Pala of male, as seen from above, much like *A. compressa* Abbott (= *zimmermanni* Fieb.); hence the name. In our key it is near *S.* (*P.*) *mackinacensis* Hungerford but is more rastrate.

Location of types: Described from 33 specimens taken in pools near shore of Douglas Lake (Cheboygan Co.), Michigan, by H. B. Hungerford. Holotype, allotype and paratypes (8 males, 23 females) in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CIV.)

CANADA: *Ontario:* Cranberry Creek, Algonquin Park, April 1, 1936, R. D. C. Martin (recorded by Walley).

U. S. A.: *Maine:* Orono, April 19, 1914, H. M. Parshley (Parshley Coll.), 1 male.

Massachusetts: Sunderland, Sept. 23, 1917, H. M. Parshley (Parshley Coll.), 1 female.

Connecticut: Cornwall, July 5, 1919, M. P. Zappa, 1 male.

New York: Long Island, July 29, 1935, J. C. Lutz (Lutz Coll.), 1 male; Cranberry Lake, July 22, 1919, Kaplan, 1 male, 4 females (Drake Coll.); Ithaca, 1890, 2 males, 1 female; Wanakena, Aug. 25, 1920, C. J. Drake (Drake Coll.); Franklin Co., Oct. 13, 1900, W. J. Gerhard, 1 male; Wanakena, Aug. 21, 1919, C. J. Drake, 2 females.

New Jersey: Bear Swamp, July 27, 1911 (Amer. Mus. Nat. Hist), 4 males, 2 females; Ramapo, May 31, 1901, 1 male, 1 female; Riverton, Aug. 17, 1902, Van Duzee (Van Duzee); Trenton, Sept., 1903 (Hussey), 1 male.

Maryland: Hyattsville, Aug. 23, 1914, W. L. McAtee (U. S. N. M.), 1 male, 2 females.

Washington, D. C.: Sept. 21, 1890 (O. Heidemann Coll., Cornell U.), 2 males, 2 females.

North Carolina: Raleigh, January, 1 male; Jocasee, Sept. 6, 1927, D. Dunavan (S. C. Exp. Sta.), 1 male, 2 females.

South Carolina: Walhalla, March 24, 1929, D. Dunavan (Clemson College).

Michigan: Ann Arbor, Mr. Clapp (Mich. Coll.), 1 female; same place, Miss Haynes (Mich. Coll.), 1 female; Pentwater, July 17, 1916, E. Liljeblad (Field Mus.), 1 male, 1 female; (Uhler Coll.), 1 male; Lake Gogebic, Aug. 18, 1937, R. H. Beamer, 2 males; Douglas Lake, East Fishtail, July 6, 1923, H. B. Hungerford, 6 females; same place, Sedge Pool, July 13, 1923, same collector, 5 males, 21 females; same place and collector, July 17, 1923, 1 male; same place and collector, Bryant's Bog, July 29, 1923, 1 male; same place and collector, Aug. 3, 1923, 1 male, 1 female; Bois Blanc Island, Aug.

14, 1923, same collector, 1 male; North Michigan, Aug. 23, 1930, same collector, 2 females.

Wisconsin: Dane Co., March 16, 1930, E. P. Breakey, 4 females; same place and collector, April 19, 1930, 3 females.

Minnesota: Beaver Dam, Aug. 12, 1922, H. B. Hungerford, 15 males, 38 females; Eveleth, Aug. 13, 1937, C. L. Johnston, 2 males; North Branch, June 17, 1922, C. E. Mickel (Minn. Coll.), 1 female; Bird's Island, Aug. 25, 1921, W. E. Hoffmann (Minn. Coll.), 1 male; St. Paul, Hussey's Pond, Aug. 7, 1921, W. E. Hoffmann (Minn. Coll.), 1 female; Pine River, Big Trout Lake, slough, Aug. 28, 1942 (H. C. Severin), 1 male, 1 female.

South Dakota: McVille, July 27, 1937, R. H. Beamer, 1 female

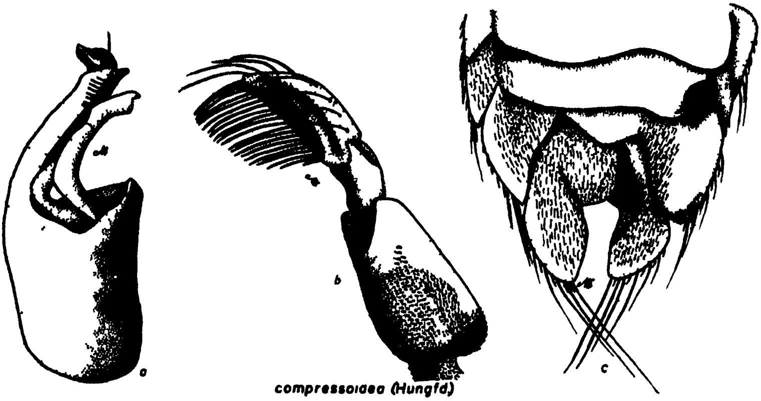

FIG 19 *Sigara* (*Phaeosigara*) *compressoidea* (Hungfd.); (a) genital capsule of male; (b) front leg of male; (c) dorsal view of male abdomen

Sigara (*Phaeosigara*) *quebecensis* (Walley)

(Plate XCVI, figs 4, 4a and 4b)

1930 *Arctocorixa quebecensis* Walley, G S, Can Ent Vol LXII, p 281, key p 285, Pl. XXI, figs 1a-1d (Knowlton, Quebec)

Size: Length 4.5 mm. to 4.8 mm. Width across eyes 1.5 mm. to 1.6 mm.

Color: General facies dark brown, tinged with red especially on outer distal portion of corium. Pronotum crossed by 5 or 6 dark bands equal in width to pale interspaces; median carina reddish. Dark color dominant on clavus and corium; in some specimens these areas are solid brown to reddish brown with margins and sutures pale; in others there are irregular splotches of pale yellow arranged in no definite pattern. Membrane pale with faint indication of pattern basally in some specimens; in others pale throughout. Embolium pale distally, smoky at base. Head and limbs pale. Venter smoky to black.

Structural characteristics: Head of male four-fifths as long as pronotal disk, that of female two-thirds as long; male head cap-shaped; interocular space about equal to the width of an eye; vertex of male rounded out beyond eye margins as seen from above; face somewhat hairy; male fovea poorly defined, narrow and very shallow; antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 14 : 30 : 21 ♂ ; 1 : 2 : 3 : 4 :: 20 : 17 : 33 : 22 ♀ . Pronotal disk twice as broad as long, rounded laterally and distally; median carina visible on anterior third; pronotum and hemelytra rugulose, the latter practically without hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of the claval suture. Lateral lobe of prothorax elongate, anterior distal angle slightly produced, tip rounded; mesoepimeron narrow with osteole near tip, basal portion expanded, almost hiding the prothoracic lobe; metaxyphus as broad across base as long, but with margins narrowing toward tip which is rather blunt. Foreleg of female of usual shape. Foreleg of male: pala cultrate, dorsal margin curved apically, broader across apical third than across base, about 18 pegs; tibia two-thirds as long as pala with a faint dorsal carina and a small pad; femur slender, ventral margin tumid, inner surface with about 9 rows of stridulatory pegs. Middle and hind legs slender; hind femur with 3 or, at the most, 4 stout pegs on distal portion of the rear margin on ventral side; proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42.6 : 32 : 42.6; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 77.8 : 102.6 : 40.4. Male asymmetry dextral; strigil large, elongate, of 7 regular combs. Right clasper of male genital capsule very narrow throughout its length. For details of male pala, abdomen and genitalia see figs. 4, 4a and 4b. Plate XCVI. Female abdomen normal.

Comparative notes: The color pattern of this species is quite distinct from others of the group. It is most closely related to *S.* (*Vermicorixa*) *cubiensis* but the shape of the male structures will readily separate these species.

Location of types: Holotype male, allotype female, and 5 male and 9 female paratypes, from "Knowlton, Que., July 6, 1929, G. S. Walley," No. 3095 in the Canadian National Collection, Ottawa, Canada. Two paratypes, male and female, with same data as above, in Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate XCIX.)

CANADA: *Quebec:* Knowlton, July 6, 1929, G. S. Walley, 1 male, 1 female (paratypes).

U. S. A.: *New Hampshire:* Hampton, April 23, 1922, S. Albert Shaw, 2 males.

Connecticut: (Hutchinson Coll., Yale).

Sigara (Phaeosigara) mackinacensis (Hungerford) 1928

(Plate C, figs 2, 2a and 2b)

1928 *Arctocorixa mackinacensis* Hungerford, H B, Can Ent Vol LX, p 228, Pl 18, figs 1 and 4 (Mackinac Island, Mich)

1930 *Arctocorixa mackinacensis*, Walley, G S, Can Ent, Vol LXII, No. 12, p 280 (Arran Lake, nr Southampton, Ontario)

Size: Length 5.0 mm. to 6.0 mm. Width across eyes 1.6 mm. to 1.8 mm.

Color: General facies medium to dark. Pronotum crossed by 7 or 8 dark bands, wider than pale ones and interrupted down center by a longitudinal pale line. Basal claval pale marks uneven and obliquely transverse, irregular and zigzag elsewhere on clavus. Pale figures of corium arranged in three wavy, narrow, irregular, often broken, longitudinal series. Membranal suture marked by palish line, figures dark with a few wavy transverse lines. Embolium, head, limbs and venter usually pale. Ventral basal abdominal segments of male sometimes dark.

Structural characteristics: Head about two-thirds as long as pronotal disk; rear margin of head carinate medianly; interocular space narrower than the width of an eye; vertex slightly projecting beyond curve of eyes in both sexes as seen from above; male fovea shallow, oval, poorly defined; face not hairy; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 20 : 18 : 40 : 20 ♂ ; 1 : 2 : 3 : 4 :: 20 : 18 : 42 : 20 ♀ . Pronotal disk rounded laterally, somewhat pointed apically; median carina on anterior third; pronotum and hemelytra faintly pebbled, only moderately rastrate, the latter not rugulose. Lateral lobe of prothorax elongate, sides parallel, tip truncate; mesoepimeron broad with osteole remote from tip, thoracic region inflated; metaxyphus broader than long, triangular. Female front leg with pala depressed on dorsal margin before the tip. Front leg of male: pala elongate, not carinate on dorsal margin, with 19 to 21 pegs arranged as in Plate C, fig. 2b; tibia with a short dorsal carina and an oval pad; femur broad at base with 8 rows of stridulatory pegs on inner surface. Middle and hind legs slender; hind femur without pegs dorsally; comparative segmentation as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 43.4 : 31.7 : 41.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 77.8 : 111.2 : 38.9. Male asymmetry dextral; strigil long, oval, of 9 regular combs. For details of male structures see Plate C, figs. 2, 2a and 2b. Female abdomen of typical form.

Comparative notes: This species is near *S.* (*P.*) *compressoidea* but is less rastrate and the pattern of the membrane is distinct.

Location of types: Described from three males and three females taken on Mackinac Island, Michigan, Aug. 19, 1925, H. B. Hungerford. The holotype and allotype are from this series. Other paratypes as follows: Douglas L., Mich., Sedge Point Pool, Aug. 15, 1923, 13 males, 20 females; Douglas Lake, Mich., Bryant's Bog, Aug. 17, 1923, H. B. Hungerford, 1 female; Douglas L., Mich., East Fish Tail pool, July 6, H. B. Hungerford, 2 females; Burt Lake, Mich., Fontenalis Run, July 7, 1923, H. B. Hungerford; Trout Lake, Mich., Aug. 25, 1923, H. B. Hungerford, 1 male; Penny Lake, Mich., Aug. 8, 1924, H. B. Hungerford, 3 males, 2 females, all in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CIV).

CANADA: *Ontario:* Arran Lake, Sept. 13, 1927, G. S. Walley.

U. S. A.: *Minnesota:* St. Paul, June 4, 1934, A. A. Granovsky, 1 female; Beaver Dam, Aug. 12, 1922, H. B. Hungerford, 1 male, 1 female; Hibbing, Aug. 15, 1922, same collector, 1 female; Itasca Park, Aug. 21, 1922, same collector, 1 male.

Michigan: Douglas Lake, summer, 1924, same collector, 2 males, 3 females; Burt Lake, July 7, 1923, same collector, 1 female; Cheboygan Co., Aug. 25, 1921, same collector, 1 male; Lake Gogebic, Aug. 18, 1937, C. L. Johnston, 1 female; Benzie Co., Crystal Lake, Aug. 26, 1919, R. F. Hussey (Hussey Coll.), 1 male; Ann Arbor, July 17, 1921, same collector and collection, 1 female; Cheboygan Co., July 12, 1918, same collector and collection, 2 males, 1 female.

Pennsylvania: Philadelphia, Aug. 1, 1929, J. C. Lutz (Lutz Coll.), 7 males, 5 females.

New Hampshire: Bath, Aug. 21, 1934, R. H. Beamer, 1 male, 4 females; Center Ossippee, July 10, 1934, M. W. Sanderson, 1 female; Hampton, April 26, 1922, S. Albert Shaw, 1 female.

Connecticut: Cockaponsett, State Forest, G. E. Pickford (Hutchinson, Yale).

Sigara (Phaeosigara) mississippiensis Hungerford

(Plate C, figs. 8, 8a and 8b)

1942. *Sigara mississippiensis* Hungerford, H. B., Bull. Brooklyn Ent. Soc., Vol. XXXVII, No. 4, p. 129, Pl. III, fig. 8 (Mississippi).

Size: Length 3.9 mm. to 4.8 mm. Width across eyes 1.3 mm. to 1.6 mm. General shape rather short and compact.

Color: General facies medium to dark brown. Pronotum with 8 dark bands about equal in thickness to pale bands, and usually interrupted down center by a longitudinal pale stripe; apical three or four bands tending to coalesce along margins. Claval suture pale with wavy dark band paralleling it; dark areas elsewhere on clavus broken into short fragments interspersed with pale ones. Dark areas of corium arranged in irregularly longitudinal series, dominant over pale areas which are short, irregular, and somewhat longitudinal; dark color etched away on outer distal angle of corium and along membranal suture. Membranal pattern fairly distinct, reticulate, distal margin dark. Embolium, head, limbs and thorax pale; basal segments of abdomen dark, apical ones pale.

Structural characteristics: Head about two-thirds as long as pronotal disk; interocular space narrow, not much more than half the width of an eye; vertex slightly produced beyond eye margins in both sexes as seen from above; face not hairy; male fovea shallow and narrow; antennal measurements as follows: 1 : 2 : 3 : 4 :: 15 : 10 : 30 : 18 ♂; 1 : 2 : 3 : 4 : 15 : 12 : 30 : 18 ♀. Pronotal disk rounded laterally and distally; median carina visible on anterior third; pronotum moderately rastrate, hemelytra rugulose, with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture in male specimens, shorter than that of claval suture in female specimens; lateral lobe of prothorax elongate, sides parallel, apex rounded; mesoepimeron moderately broad with osteole about half way to lateral bend; metaxyphus broader than long. Front leg of female of usual shape, except pala slightly concave on dorsal margin near apex. Front leg of male pala cultrate, of same width throughout, with distal margin slightly curved, 15 to 18 pegs in a single row, the apical 13 or 14 large and blunt, basal ones smaller; tibia about half as long as pala with no carina and no pad; femur relatively slender with a patch of about 10 rows of stridulatory pegs on inner surface. Middle and hind legs slender; hind femur without dorsal spines; the average measurements of legs of three males and three females as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 48 : 32.7 : 50.1. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 81.9 : 100 : 46.1. Male asymmetry dextral; strigil small, 6 or 7 regular combs; seventh abdominal segment without a median lobe; left anal lobe deeply incised on dorsal inner margin. For details of male structures see Plate C, figs. 3, 3a and 3b. Female abdomen normal.

Comparative notes: This species is very near *S. mackinacensis* (Hungerford), described from northern Michigan. In color pattern it is almost identical. However, it is distinctly a smaller species. The vertex in both sexes is more produced and the male pala, the strigil and the right clasper are uniformly different.

Location of types: Described from 18 specimens from Lauderdale, Mississippi, July 17, 1930, taken by R. H. Beamer, Paul W. Oman and L. D. Tuthill. Holotype male, allotype and paratypes in Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate CIV).

Mississippi: Beaumont, April 19, 1932, H. Dietrich (Miss. Coll.), 17 males, 16 females.

Alabama: Grand Bay, July 11, 1934, R. H. Beamer, 2 females.

Georgia: Emanuel Co., Sept. 6, 1929, Creaser and Becker, 1 female; Prattsburg, July 25, 1930, R. H. Beamer, 1 female; Macon, July 25, 1930, L. D. Tuthill, 1 female; Baker Co., Dec. 23, 1946, L. W. Morgan, 19 males, 22 females.

South Carolina: New Berry, Mathews Lake, Oct. 23, 1930, D. Dunavan (U. S. N. M.), 1 male.

District of Columbia: Washington, April 27, 1907, W. L. McAtee (Cornell), 1 male.

Sigara (Phaeosigara) macropala (Hungerford) 1926

(Plate CII, figs 1, 1a and 1b)

1926. *Arctocorixa macropala* Hungerford, H B, Bull. Brooklyn Ent Soc., Vol XXI, pp. 196-197, figs. 6, 9 and 11 (desc. Michigan).

1946. *Arctocorixa macropala,* Proctor, Wm, Biol. Sur. of Mt. Desert Region, Inc Part VII, The Insect Fauna, p. 82 (S. W. Harbor, June 18, Mt. Desert Isld, Maine).

Size: Length 5.3 mm. to 5.5 mm. Width across eyes 1.7 mm. to 1.8 mm.

Color: General facies medium to dark. Pronotum crossed by 5 or 6 broad brown bands, not interrupted down center. Pale figures of hemelytra small, wavy, and somewhat transverse. Margins of sutures pale. Membrane and corium separated by pale line. Embolium, head, limbs and thorax pale; abdominal venter smoky.

Structural characteristics: Head about three-fourths as long as pronotal disk, bluntly conical in male; interocular space narrower than the width of an eye; rear margin of head flattened, rastrate and distinctly carinate medianly, especially in male; vertex projecting beyond curve of eyes in male; face not hairy; male fovea oval, moderately large, not quite attaining eyes laterally; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 20 : 15 : 35 : 28 ♂ ; 1 : 2 : 3 : 4 :: 20 : 15 : 35 : 28 ♀. Pronotal disk a little more than half as long as wide, rounded laterally and distally, median carina on anterior fourth; pronotum and hemelytra coarsely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax elongate, slender, rounded apically; mesoepimeron narrow with osteole near the tip; metaxyphus short, broader than long, triangular. Front leg of female of usual shape but with pala depressed on dorsal margin near tip. Front leg of male: pala short and broad, widest across distal portion, 19 small pegs in curving row (see Plate CII, fig. 1b); tibia two-thirds as long as pala, with distinct dorsal carina and no pad; femur slender with about 7 rows of stridulatory pegs on inner surface surrounded by moderately long hairs. Middle and hind legs slender, the hind femur with row of stout, sharp-pointed pegs on inner dorsal margin; segmental proportions:

Middle leg: femur : tibia : tarsus : claw :: 100 : 49.1 : 32.8 : 45.5; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 81.8 : 121.2 : 42.4. Male asymmetry dextral; strigil small, longer than broad, of 4 or 5 fairly regular combs. Right clasper thickened at base with terminal half turned at nearly a right angle. For details of male structures see Plate CII, figs. 1, 1a and 1b. Anal lobes of female not notched on inner ventral margins.

Comparative notes: This species seems to be closely allied to *S. variabilis* (Hungerford) especially as regards the palae of both males and females. The two can be distinguished, however, by the male characters as listed above, and in the females by the color pattern and the length of the pruinose area of the embolar groove as compared to that of the claval suture.

Location of types: Described from 12 specimens from Douglas Lake, Michigan, area including holotype male and 2 paratypes (male and female) labeled "Douglas L., Mich., Aug. 8, 1924, H. B. Hungerford." Allotype female and 5 paratypes (2 males, 3 females) labeled "Machinac Isl., St. Park, Mich., Aug. 19, 1925 H. B

Hungerford," all in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate CIV).

U. S. A.: *Minnesota:* Itasca Park, Aug. 21, 1922, H. B. Hungerford, 1 male.

Michigan: Douglas Lake, July 14, 1924, H. B. Hungerford, 1 female; same place and collector, Aug. 8, 1924, 2 males; Mackinac Isld., Aug. 19, 1925, same collector, 2 males, 4 females.

Maine: Lincoln Co., July 15, 1938, D. J. Borror (Lutz Coll.).

New York: Cold Springs Harbor, L. I., July 20, 1920, P. Butler (Hussey Coll.), 1 male, 1 female.

Massachusetts: Woodsville, July, 1911, 2 males, 3 females.

Rhode Island: (Uhler Coll.), 1 male, 1 female.

New Jersey: Lakehurst, Aug. 2, 1922, L. B. Woodruff, 1 male, 1 female; same place, May, 1905, 2 males; Rancoca, Aug. 30, 1927, E. M. Beeton, 2 males, 8 females; Pemberton, April 27, 1914, H. B. Scammell, 1 male.

Maryland: Pawtuxent Wild Life Reserve, April 11, 1945, R. I. Sailer, 2 females.

Florida: Gainesville, Sept. 28, 1914, 1 male, 1 female; Bunker Branch, Arcadia, March 30, 1938, J. C. Bradley, 1 male, 2 females.

*Sigara (Phaeosigara) signata** (Fieb.)
(= *A. seriata* Abbott)

(Plate CII, figs 2, 2a-2b, wash drawing No 31, Plate VI)

1851. *Corisa signata* Fieber F. X., Species Generis Corisa, p 21, Tab I, fig 16 (Pennsylvania).

1889. *Corisa signata*. Garman, H., Bull Ill State Lab Natural History, pp 1-53 (Quincy, Ill. I have not seen.).

1909. *Arctocorisa signata*, Kirkaldy, G. W., and Torre-Bueno, J R de la, Catalogue *in* Proc Ent Soc. Wash., X, p. 197.

1913. *Arctocorisa signata*, Abbott, J. F., Bull. Brooklyn Ent. Soc., VIII, p. 83 (figures pala) (Gainesville, Ga.) (correctly det.).

1916. *Arctocorixa seriata* Abbott, J. F., Ent. News XXVII, p. 342 (Massachusetts, Connecticut, Maine, Rhode Island, and New Hampshire).

1917. *Arctocorisa seriata,* Parshley, H. M., Occasional Papers of the Boston Society for Natural History, VII, p. 118. (Det. by Abbott but a mixed lot. Orono, Me., Apr 19, 1914 = *mullettensis*; Paris, Me., Apr. 7, 1915 (C. A. F.) = *solensis* and *mullettensis*; Durham, N. H., Sept. 20, 1901 = *mullettensis* Pownal, Me., Peru, Mass., and Conn. specimens correctly named.)

1917. *Arctocorisa scabra,* Parshley, H. M., Occ. Papers of Boston Soc Nat. Hist., VII, p. 119 (in part).

1917. *Arctocorixa seriata,* Van Duzee, E. P., Catalogue of the Hemiptera of America North of Mexico, p. 488.

1917. *Arctocorixa signata,* Van Duzee, E. P., Catalogue of the Hemiptera of America North of Mexico, p. 483.

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* Do not confuse with *Sigara signata* B. White, 1879, which is now *Tenagobia signata* (B. White).

1923. *Arctocorixa seriata,* Abbott, J. F., *in* "Guide to the Insects of Connecticut," Part IV, "The Hemiptera or Sucking Insects of Connecticut," p. 390, fig. 36 (18) (Hamden, New Haven and Cheshire, Conn.).

1926. *Arctocorixa signata,* Blatchley, W. S., Heteroptera of Eastern North America, pp. 1074, 1077 (Indiana, Florida, New Jersey, New York, Pennsylvania, Illinois, and Georgia).

1926. *Arctocorixa seriata,* Blatchley, W. S., Heteroptera of Eastern North America, pp. 1073, 1074, 1075, Pl. XII, fig. 18 (New England states).

1929. *Sigara signata,* Lundblad, O., Archiv. für Hydrobiologie, Bd. XX, pp. 303-307, text figs. 9-13; Pl. XI, fig. 3 (redescription).

1930. *Arctocorixa seriata,* Walley, G. S., Canadian Entomologist, LXII, No. 4, p. 77; No. 12, p. 281 (records north shore Gulf St. Lawrence).

1931. *Sigara signata,* Lundblad, O., "Zoologischer Anzeiger," Bd. 96, Heft 3/4, pp. 85-95.

1946. *Sigara seriata,* Proctor, Wm., Biological Survey of the Mt. Desert Region, Inc., Part VII, The Insect Fauna, p. 82 (Salisbury Cove, Aug. 11, Mt. Desert Island, Me.).

Size: Length 4.6 mm. to 5.2 mm. Width of head across eyes 1.6 mm. to 1.8 mm. General shape rather broad and compact.

Color: General facies medium to dark. Pronotum crossed by 6 to 7 brown lines about as wide as paler interspaces. Pattern of hemelytra obscure, consisting of wavy, irregular splotches of intermingled dark and pale areas in faintly longitudinal series. Membrane and corium separated by broad pale band; darker pattern etched way at outer apical angle of corium. Embolium, head, and venter smoky, limbs pale to smoky.

Structural characteristics: Head about half as long as pronotal disk; interocular space about equal to the width of an eye; postocular space rather broad at inner angles of eyes; vertex not produced as seen from above; male fovea broad, but shallow, not quite attaining eyes laterally; facial hairs few; antennal segmentation: 1 : 2 : 3 : 4 :: 18 : 15 : 30 : 25 males; 1 : 2 : 3 : 4 :: 18 : 15 : 30 : 25 females. Pronotal disk with median carina visible on anterior third, rounded distally; pronotum and hemelytra finely rastrate, the latter with a few pale hairs. Lateral lobe of prothorax about half as broad at base as long, apex rounded; mesoepimeron broad with osteole about half way between tip and lateral emargination. Metaxyphus longer than broad, apex pointed. Front leg of female of typical shape except pala depressed on dorsal margin near apex. Front leg of male: pala short and rather broad, peg row sinuate, of about 16 large pegs; tibia three-fourths as long as pala, slender, without a pad; femur relatively slender, sides nearly parallel, with a patch of about 7 rows of stridulatory pegs on inner surface. Middle and hind legs slender; hind femur with inner dorsal margin bordered with short, spine-like hairs for its entire length; hind femur pubescent ventrally for two-thirds its length, and with 2 or 3 rows of spines dorsally; comparative measurements of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.2 : 32.6 : 38.4. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 74.3 : 96.9 : 42. Male asymmetry dextral; strigil relatively large, oval, of 4 or 5 irregular combs. Seventh abdominal segment with rear margin almost straight across median portion. Left lobe of eighth segment broad. Right clasper of genital capsule much curved and flap-like processes near its tip. For details of male structures see Plate CII, figs. 2, 2a and 2b. Female abdomen normal.

Location of types: Fieber's types in the Berlin Museum and the Halense Museum. Abbott's types of *A. seriata* given by H. M. Parshley to the Snow Entomological Collections, University of Kansas. Localities: 2 females, labeled holotype and allotype, from Peru, Mass., Aug. 27, 1904; paratypes, 1 male, Cheshire, Conn., March 20, 1911, B. H. Walden; 2 females, New Haven, Conn., May 6, 1904, H. L. Viereck; 1 male, 1 female, Hamden, Conn., Oct. 24, 1910, B. H. Walden; 2 females, Pownal, Me., Oct. 13, 1900, A. A. Stover; 1 male, 1 female, Orono, Me., July 10, 1910. The male specimen from Orono, Me., is not *signata* (= *seriata*) but *S. zimmermanni* (Fieb.) (= *compressa* Abbt.).

Data on distribution: (Plate CIV).

CANADA: *Newfoundland:* Lewisport, July-Aug., 1905, L. P. Gratacap, 1 female.

Ontario: Thunder Bay Beach, July 28, 1939, H. S. Parish (Lutz).

U. S. A.: *Maine:* Orono, April 20, 1912, H. M. Parshley (Parshley Coll.), 1 male, 1 female; Pownal, Oct. 13, 1900, O. O. Stover, 1 male, 1 female; (Uhler Coll.), 1 male, 1 female; Bethel, Songo Park, Aug. 19, 1915, 1 male, 1 female; Peak's Island, Aug., 1924, G. A. Moore.

New Hampshire: Hermit Lake (Uhler Coll.), 1 female; Durham, 2 males (Parshley Coll.); Hampton, March 31, 1933, S. Albert Shaw; same place and collector, March 27, 1932; same place and collector, April 10, 1913; same place and collector, April 27, 1933.

Massachusetts: Melrose High, June 17, 1908, D. H. Clemons, 1 female; Natick, Oct. 26, 1924, L. B. Woodruff, 1 female; same place, April 27, 1919, C. A. Frost, 1 male; Wilbraham, Feb. 10, 1902, F. Knabb, 1 male; Blanchard (Parshley), 1 male (det. by Abbott as var. of *compressa*); Peru, Oct. 27, 1904 (Uhler Coll.), det. by Uhler; Sherborn, April 11, 1920, C. A. Frost, 1 male; Woods Hole, Aug., 1911, J. F. Abbott, 1 male, 1 female; Aug., 1911, J. F. Abbott, 1 male.

Connecticut: Cheshire, March 20, 1911, B. H. Walden, 1 female; Storrs, Aug. 13, 1946, R. H. Beamer, 13 males, 8 females; Litchfield, April 2, 1924, L. B. Woodruff, 1 female; Hamden, Oct. 21, 1910; New Haven, May 6, 1904; Packing, State Forest, G. E. P. (Hutchinson Coll., Yale).

Rhode Island: Providence, 1918 (Davis Coll.), 1 female; Kingston, May 2, 1904 (Parshley Coll.), 1 female; (Baker in U. S. N. M.), 1 male, 4 females.

New York: White Plains, Sept. 13, 1919, Torre-Bueno and Hussey, 2 males, 6 females; Wanakena, Aug. 1-7, 1917, C. J. Drake (Drake Coll.), 2 males, 5 females; Flatbush, L. I., April 3, 1890, 1 female; Cold Springs Harbor, L. I., July 26, 1920, Priscilla Butler, 3 males, 8 females; Cranberry, 1 male; Franklin Co., Oct. 12, 1900, W. J. Gerhard (Parshley Coll.); Ithaca, April, 1929, H. B. Hungerford, 1 female; same place and collector, June 8, 1929, 1 female; same place and collector, 1929, 3 females; Cranberry Lake, Aug. 5, 1917, C. J. Drake (Drake).

New Jersey: (Uhler Coll.), 1 male, 2 females; Lakehurst, Sept. 16, 1923, L. B. Woodruff, 1 female.

Pennsylvania: Lehigh Gap, Aug. 11, 1904 (Drake Coll.).

Maryland: Pawtuxent Wild Life R., April 11, 1945, R. I. Sailer (U. S. N. M.), 2 males, 4 females.

North Carolina: Boardman, Sept. 12, 1915, R. W. Leiby, 1 female.

South Carolina: Richland, March 26, 1931, D. Dunavan (S. C. Exp. Sta. Coll.), 1 female.

Georgia: 1 male, 1 female; Brantley Co., January 3, 1947, L. W. Morgan, 3 males, 1 female; Gainesville, 1911 (Cornell Coll.), 1 male, 1 female; Athens, March 28, 1911 (Cornell U.).

Ohio: Ira, Summit Co., Aug. 31, 1916, C. J. Drake (Drake).

Michigan: Washtenaw Co., Sept. 5, 1914, F. M. Gaige (Mich. Coll.), 1 male, 1 female; Ann Arbor, Miss Haynes (Mich. Coll.), 2 males, 3 females; same place, Nov. 3, 1917, 2 females; Pentwater, July 17, 1916, E. Liljeblad (Field Mus.), 1 male, 2 females; Charlevoix Co., Beaver I., Sept., 1922, R. F. Hussey (Hussey Coll.), 2 females; Battle Creek, June 21, 1921, Priscilla Butler, 1 male, 5 females; Bois Blanc Island, Aug. 14, 1932, H. B. Hungerford, 1 male, 1 female; Burt Lake, July 7, 1923, same collector, 1 female; Cheboygan Co., July 12, 1918, R. F. Hussey (Hussey Coll.), 2 males, 6 females; Douglas Lake, Sedge Point Pool, July 3, 1923, H. B.

Hungerford, 5 females; same place and collector, July 6, 1923, 5 females; same place and collector, Aug. 1, 1923, 8 males, 30 females; same place and collector, Aug. 17, 1923, 5 males, 13 females; same place and collector, Aug. 12, 1925, 1 male, 10 females; same place and collector, July 30, 1924, 1 female; same place and collector, July 13, 1923, 1 male, 5 females; June 30, 1923, 1 female; same place and collector, Bryant's Bog, July 17, 1923, 10 males, 11 females; same place and collector, July 29, 1923, 13 males, 16 females; same place and collector, Mud Lake, July 31, 1923, 2 males, 11 females; same place and collector, Aug. 4, 1923, 13 females; same place and collector, Beach Drift, Aug. 3, 1923, 1 male, 2 females; same place and collector, Smith's Bog, June 11, 1923, 2 females; same place and collector, July 16, 1923, 1 female; same place and collector, E. Fishtail Pool, July 6, 1923, 3 females; same place and collector, Trout Creek, Aug. 9, 1922, 1 female; same place and collector, Aug. 25, 1925, 3 females; same place and collector, 1924, 1 male; same place and collector, July 4, 1923, 1 female; Douglas Lake, 1 male.

Illinois: North Illinois (Uhler Coll.), 1 female.

Wisconsin: Brule, Aug. 16, 1937, C. L. Johnston, 1 female.

Minnesota: Minneapolis, April 6, 1922, W. E. Hoffmann, 1 male (Minn. Coll.); same place, Oct. 11, 1919, R. F. Hussey (Hussey), 6 males, 26 females; St. Paul, Oct. 22, 1919, same collector, 1 female; B'aver Dam, Aug. 12, 1922, H. B. Hungerford, 3 males, 2 females; Cooley, Aug. 13, 1937, H. T. Peters, 1 female; Pine River, Big Trout Lake, Aug. 22, 1939, H. C. Severin, 4 males, 2 females; Itasca Park, Aug. 21, 1922, H. B. Hungerford, 12 males, 16 females; Pelican Rapids, Aug. 22, 1922, same collector, 1 male; St. Paul, Indian Mound Pk., June 26, 1921, same collector (Minn.), 1 male, 2 females; same place, Hussey's Pond, June 29, 1921, W. E. Hoffmann (Minn.), 1 female; Ramsey Co., Snail Lake, June 19, 1921, same collector and collection, 1 female.

Sigara (Phaeosigara) paludata Hungerford

(Plate CIII, figs. 1, 1a and 1b)

1942. *Sigara paludata* Hungerford, H. B., Bull. Brooklyn Ent. Soc., Vol. XXXVII, No. 4, pp. 127-128, Pl. III, fig. 1 (Mississippi).

Size: Length 3.38 mm. to 3.9 mm. Width across eyes 1.13 mm. to 1.35 mm.

Color: General facies dark and obscure. Pronotum crossed by 7 brown bands, none of them attaining lateral margins of disk.

Claval lineations broken into many segments and tending to be obliquely arranged; corium with light and dark markings arranged in wavy longitudinal series. Outer distal angle of corium and distal portion of membrane hyaline; base of membrane with obscure pattern. Embolium, head, limbs and venter pale.

Structural characteristics: Head more than half as long as the pronotal disk; interocular space equal to or slightly narrower than the width of an eye; rear margin of head slightly carinate medianly; vertex of male slightly produced as seen from above; postocular space rather broad along inner angles of eyes; male fovea shallow, oval, narrow, not attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 16 : 8 : 25 : 18 ♂; 1 : 2 : 3 : 4 :: 18 : 10 : 28 : 20 ♀. Pronotal disk rounded laterally and distally; median carina barely visible on anterior margin; pronotum faintly and hemelytra nonrastrate, faintly rugulose, the latter with a few pale hairs; pruinose area of embolar groove posterior to the nodal furrow slightly shorter than that of the claval suture. Lateral lobe of prothorax elongate, sides parallel, tip truncate; mesoepimeron narrow with osteole near the tip; metaxyphus broader than long. Front leg of female of usual shape, except dorsal margin of pala slightly depressed near apex and short in proportion to length of tibia. Front leg of male: pala broad distally, obliquely truncate across apex, peg row interrupted distally with 4 small pegs lying along distal margin and 9 to 10 stouter pegs basally between dorsal margin and upper palmar row of bristles (see Plate CIII, fig. 1); tibia about two-thirds as long as pala, with no dorsal carina and no pad; femur slender with 9 or 10 rows of small stridulatory pegs on inner surface. Middle and hind legs slender; hind femur with a stout row of spines dorsally; the proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42.9 : 34.9 : 41.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 75 : 100 : 39.8. Male asymmetry dextral; strigil small, elongate oval, of 3 or 4 regular combs. Right margin of seventh abdominal segment with a knob-like projection. Right clasper of genital capsule with a curious hood-like flap at about the center, which suggested the name *paludata,* wearing a cloak, and with tip divided. For details of male structures see Plate CIII, figs. 1, 1a, and 1b. Female abdomen normal.

Comparative notes: This species has the color pattern of *S. signata* (Fieb.) and the shape of the male pala is much the same. It is, however, a much smaller species and has a relatively narrower mesoepimeron with the osteole near the tip instead of remote from the tip as in *S. signata* (Fieb.). In size it is but slightly larger than *S. bradleyi* (Abbott.) The pronotum has more pale bands. but the pattern of the hemelytra is about the same.

Location of types: Described from holotype male, allotype female and four paratypes (1 male, 3 females) taken at Nealy, Miss., Sept. 2, 1930, by H. Dietrich, and one male paratype from Wrens, Ga., Aug. 22, 1930, Paul W. Oman. These are in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CIV).

Mississippi: Nealy, Sept. 2, 1930, H. Dietrich, 2 males, 4 females (type series).

Georgia: Wrens Co., Aug. 22, 1930, P. W. Oman, 1 male (paratype).

Sigara (*Phaeosigara*) *macrocepsoidea* Hungerford

(Plate CIII, figs 2, 2a and 2b)

1942. *Sigara macrorepsoidea* Hungerford, H. B., Bull. Brooklyn Ent. Soc., Vol XXXVII, No. 4, p. 128, Pl. III, fig. 2 (Georgia)

Size: Length 2.48 mm. to 3.6 mm. Width across eyes 1 mm. to 1.3 mm. General shape short and compact.

Color: General facies dark, *S. signata* (Fieb.) type of pattern. Pronotum crossed by about 4 dark bands, the second of which does not extend all the way across. Claval figures broken into many segments, arranged somewhat obliquely. Corial pattern also broken, wavy, the light and dark figures in faintly longitudinal series but not so much so as in *S. paludata* Hungerford which this species closely resembles in color pattern; corium semihyaline on outer distal angle; pattern of membrane continuous with that of corium, except slightly paler. Embolium, head, limbs, and venter pale.

Structural characteristics: Since this is a brachypterous species, the head is half again as long as the pronotal disk; interocular space equal to or slightly narrower than the width of an eye; postocular space fairly broad, especially at inner angle of the eye; rear margin of head carinate medianly; vertex not produced as seen from above; face not hairy; male fovea broad but shallow; antennal segmentation: 1 : 2 : 3 : 4 :: 10 : 8 : 20 : 10 ♂ ; 1 : 2 : 3 : 4 :: 12 : 10 : 22 : 10 ♀ . Pronotal disk short, rounded laterally and distally, with faint indication of median carina on anterior third; pronotum rugulose, hemelytra smooth, shiny, with very few hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax elongate, tip obliquely truncate, anterior distal angle slightly produced; mesoepimeron narrow with osteole near the tip; metaxyphus plainly longer than broad. Front leg of female of usual shape, except pala slightly depressed dorsally near apex. Front leg of male: pala rather short and broad, tip obliquely truncate, peg row with 3 large pegs distally and 9 others, smaller pegs arranged as in Plate CIII, fig. 2; tibia almost as long as pala, though narrower, with no dorsal carina and no pad; femur rather stout compared to tibia and pala, with patch of stoutish hairs on inner surface. Middle leg rather stout, compared to length; hind leg slender; hind femur without dorsal spines; proportions of segments as follows (average of 3 males and 3 females):

Middle leg: femur : tibia : tarsus : claw :: 100 : 47.3 : 34.6 : 47.3.
Hind leg: femur : tibia : tarsus 1 : tarsus 2 : 100 : 81.8 : 100 : 40.5.
Male asymmetry dextral; strigil elongate, of 4 regular combs; left anal lobe very broad and with a patch of short spines on dorsal surface. Male abdomen and capsule as on Plate CIII, figs. 2a and 2b. Female abdomen normal.

Comparative notes: This little species reminds one of *T. macroceps* and is the smallest species in *Sigara*.

Location of types: Described from the holotype, allotype and paratypes labeled as follows: "Okefenokee Swamp, Georgia, Aug. 3, 1934, R. H. Beamer, P. A. McKinstry, M. E. Griffith, collectors," 5 males, 8 females; also paratypes labeled "Okefenokee Swamp, Georgia, July 30, 1934, R. H. Beamer," 5 males, 8 females; "Folkston, Georgia, Aug. 2, 1934, R. H. Beamer," 1 male, 2 females. The above are in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CIV).

Georgia: See type series above.

Texas: Wood Co., Feb. 26, 1939, D. Millspaugh, 3 females, 1 nymph.

Sigara (*Phaeosigara*) *dolabra* Hungerford and Sailer

(Plate CIII, figs. 3, 3a-3e)

1942. *Sigara dolabra* Hungerford, H B., and Sailer, R. I., Bull. Brooklyn Ent. Soc., Vol. XXXVII, No. 5, pp. 170-180, 1 pl. (Minnesota and Michigan).

Size: Length 5.3 mm. to 6.3 mm. Width across eyes 1.8 mm. to 2 mm.

Color: General facies a little darker than the medium. Pronotum crossed by 6 or 8 dark bands about as wide as pale interspaces, anterior ones not extending quite to lateral margins of the pronotal disk; posterior ones coalescent along margins. Dark bands of clavus obliquely transverse, narrower at base of clavus than distally and broader than pale interspaces. The pale figures of the corium broken and confused but not in longitudinal series. Membrane rather dark, pattern obscure, separated from corium by a pale line. Dark spot on outer margin of membrane just beyond membranal suture. Embolium smoky; head and limbs pale yellowish brown; venter smoky to black, with pale margins.

Structural characteristics: Head two-thirds as long as pronotal disk; interocular space less than the width of an eye; with median longitudinal carina on caudal half; inner margins of eyes nearly parallel, only slightly diverging; vertex smoothly rounded, not produced beyond curve of eyes in either sex; face not hairy; male fovea shallow; narrow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 20 males; 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 20 females. Pronotal disk with lateral margins truncate, rounded apically, and with faint median carina on anterior fourth; pronotum and hemelytra finely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow slightly shorter than that of the claval suture. Lateral lobe of prothorax elongate, sides nearly parallel, apex rounded; mesoepimeron moderately narrow with osteole near the tip; metaxyphus long and narrow. Front leg of female: Pala faintly depressed on dorsal margin before its tip. Front leg of male: Pala cultrate, not quite half as broad across middle as long, tapering to claw apically, carinate on dorsal margin near base, 20 to 21 pegs in a single, curved row; tibia about two-thirds as long as pala with a dorsal carina and a small pad, a patch of short spines on inner surface near center; femur slender with several stout spines distally and a patch of about 10 rows of stridulatory pegs basally on inner surface. Middle and hind legs slender; claw of middle leg short, about half as long as its tarsus; hind femur with a short row of spines dorsally; comparative measurements of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 58 : 34.8 : 43.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 94.4 : 117.3 : 42.9. Male asymmetry dextral; strigil rather large, elongate, of 6 regular combs. Median lobe of seventh abdominal segment truncate apically; right margin of same segment with a small lateral projection. For details of male structures see Plate CIII, figs. 3, 3a to 3e. Female abdomen normal.

Comparative notes: While in color pattern and size this species resembles *H. minorella* (Hungerford), it has the lateral lobe of the prothorax tongue-shaped instead of obliquely truncate as in *H. minorella* which was taken on the same date and place with this type series.

Location of types: Described from 11 males and 10 females bearing the label "Itasca Park, Minn., Green Lake, Aug. 21, 1922, H. B. Hungerford." Holotype, allotype and paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas. Some paratypes in the University of Minnesota collection.

Data on distribution: (Plate CIV.) Besides the types we have the following:

U. S. A.: *Minnesota:* St. Louis Co., Aug. 14, 1922, H. B. Hungerford, 1 male; St. Paul, July 1-14, 1921, same collector, 2 females.

Michigan: Douglas Lake, Aug. 17, 1923, H. B. Hungerford, 1 male; same place and collector, Aug. 12, 1925, 1 male; Cheboygan Co., July 16, 1918, R. F. Hussey (Hussey Coll.), 1 male.

Rhode Island: (C. F. Baker Coll. in U. S. N. M.) 1 female.

PLATE C

Sigara Phaeosigara new subgenus

FIG. 1. *Sigara (Vermicorixa) gordita* (Abbott)*; genital capsule of the male.

FIG. 1a. Pala of male.

FIG. 1b. Dorsal view of male abdomen.

FIG. 2. *Sigara (Phaeosigara) mackinacensis* Hungerford; dorsal view of male abdomen.

FIG. 2a. Genital capsule of male.

FIG. 2b. Pala of male.

FIG. 3. *Sigara (Phaeosigara) mississippiensis* Hungerford; pala of male.

FIG. 3a. Genital capsule of male.

FIG. 3b. Dorsal view of male abdomen.

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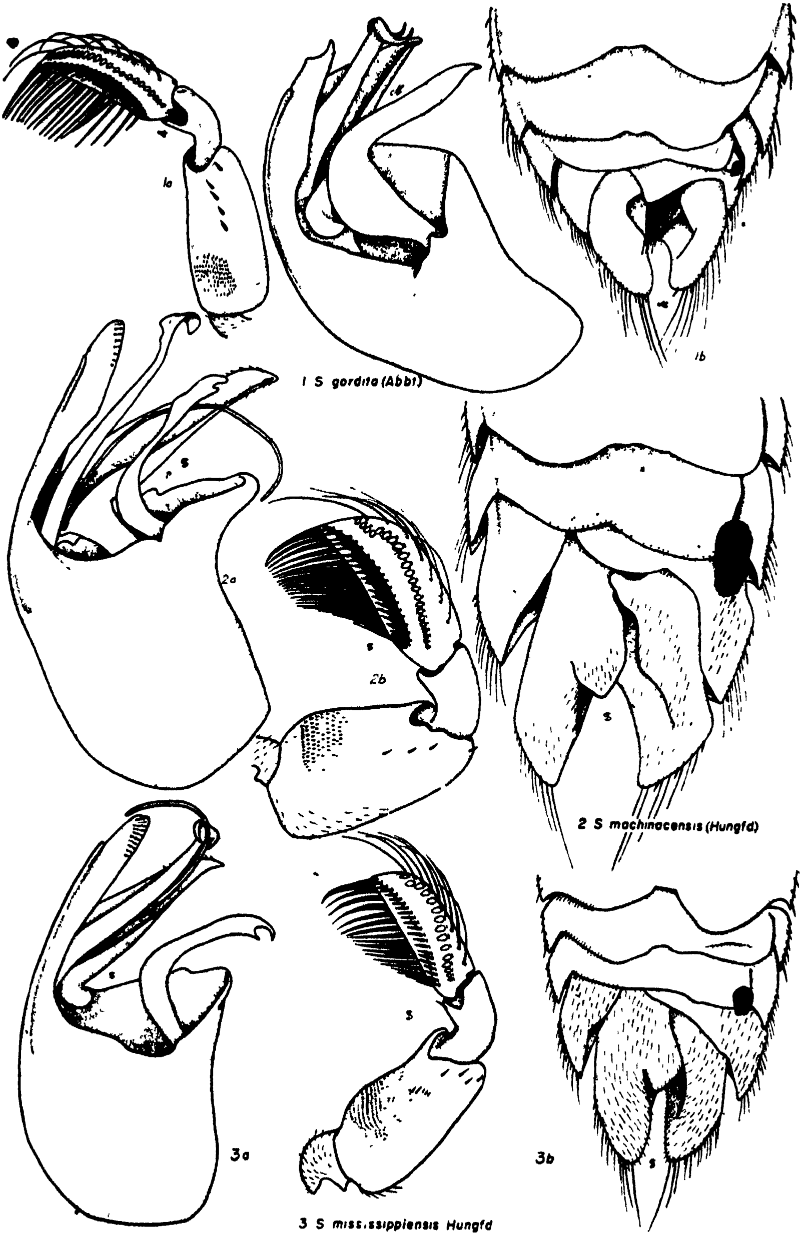
* *S. (V.) gordita* (Abbott) was at first believed to be related to this group, but subsequent checking of group characters has led us to place it with *alternata* (Say) and allied species.

PLATE C



1 S gordita (Abbt)

2 S machinacensis (Hungfd)

3 S mississippiensis Hungfd

PLATE CI

Sigara Phaeosigara new subgenus

FIG. 1. *Sigara (Phaeosigara) bradleyi* (Abbott); dorsal view of male abdomen.

FIG. 1a. Pala of male.

FIG. 1b. Genital capsule of male.

FIG. 2. *Sigara (Phaeosigara) sigmoidea* (Abbott); dorsal view of male abdomen.

FIG. 2a. Pala of male.

FIG. 2b. Genital capsule of male.

FIG. 3. *Sigara (Phaeosigara) zimmermanni* (Fieber) [= *compressa* (Abbott)]; dorsal view of male abdomen.

FIG. 3a. Pala of male.

FIG. 3b. Pala of male from dorsal view

FIG. 3c Genital capsule of male

PLATE CI

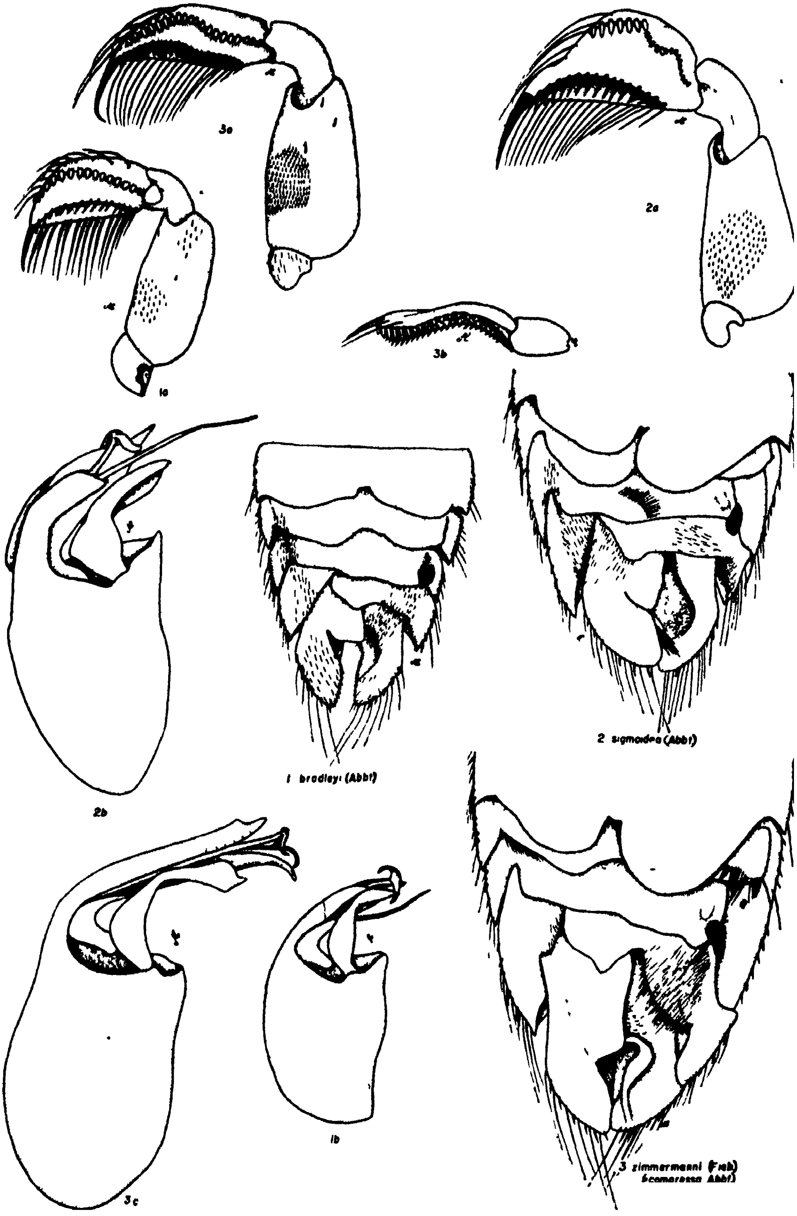

3a
1a
2a
3b
2b
1 bradleyi (Abbt)
2 sigmoidea (Abbt)
3c
1b
3 zimmermanni (Fieb)
(camarossa Abbt)

PLATE CII

Sigara Phaeosigara new subgenus

FIG. 1. *Sigara (Phaeosigara) macropala* (Hungerford); dorsal view of male abdomen.

FIG. 1a. Genital capsule of male.

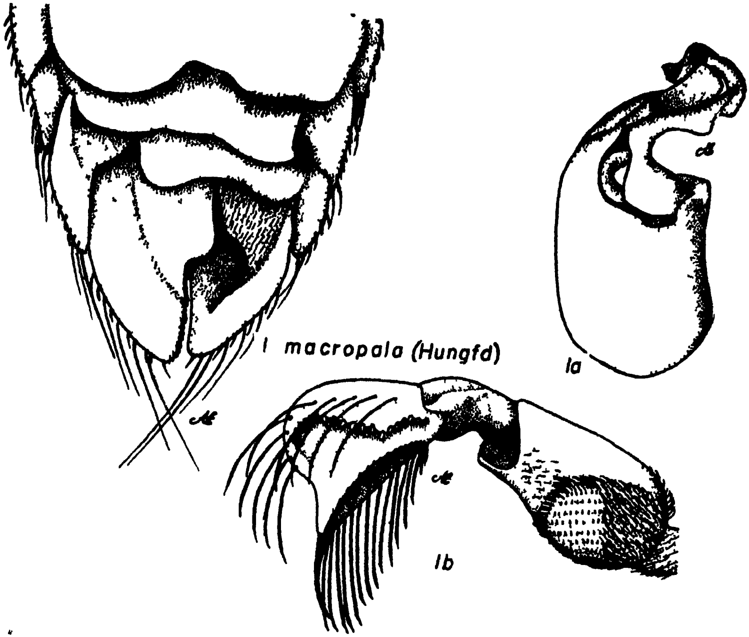
FIG. 1b. Male pala.

FIG. 2. *Sigara (Phaeosigara) signata* (Fieber); dorsal view of male abdomen.

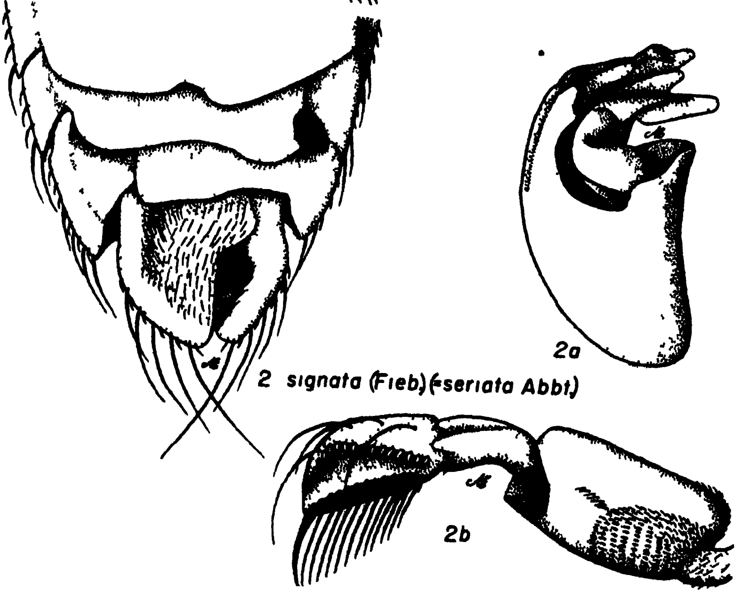
FIG. 2a. Genital capsule of male.

FIG. 2b. Male pala.

PLATE CII



1 macropala (Hungfd)



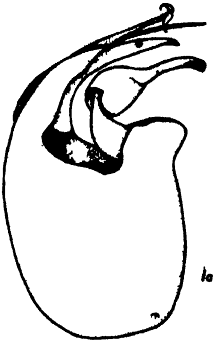
2 signata (Fieb.) (=seriata Abbt.)

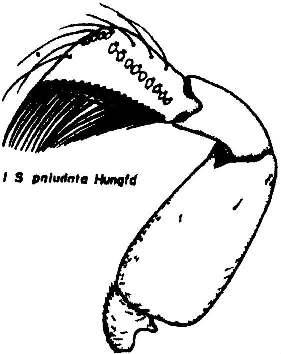
PLATE CIII

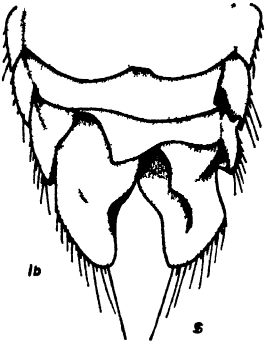
Sigara Phaeosigara new subgenus

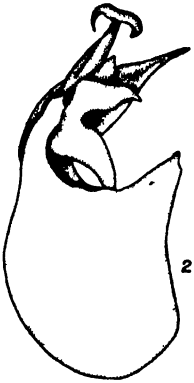
FIG 1 *Sigara (Phaeosigara) paludata* Hungerford; pala of male
FIG. 1a. Genital capsule of male.
FIG. 1b. Dorsal view of male abdomen.
FIG. 2. *Sigara (Phaeosigara) macrocepsoidea* Hungerford; pala of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Dorsal view of male abdomen.
FIG. 3. *Sigara (Phaeosigara) dolabra* Hungerford & Sailer; pala of male
FIG. 3a. Right clasper of male genital capsule.
FIG. 3b. Metaxyphus.
FIG. 3c. Left clasper of male genital capsule
FIG. 3d Dorsal view of male abdomen
FIG. 3e. Lateral lobe of prothorax.

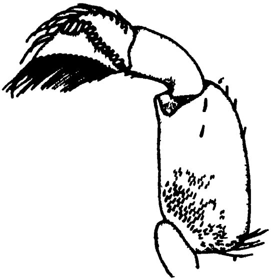
PLATE CIII

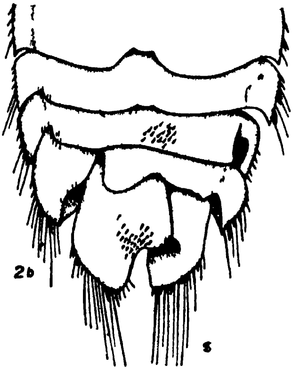

1a


1 S paludata Hungfd


1b


2a


2 S macrosepsoidea Hungfd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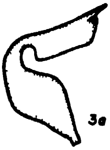
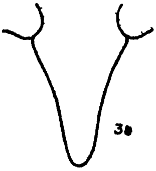

3a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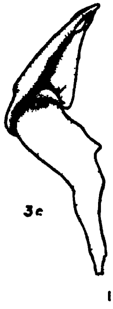
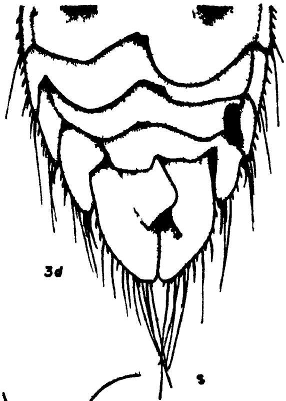
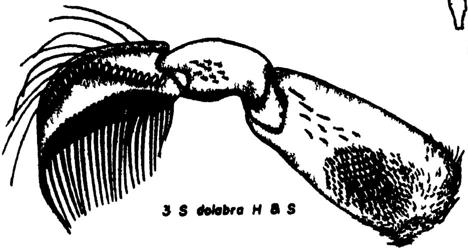

3c


3d


3 S dolabra H & S

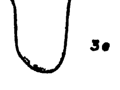
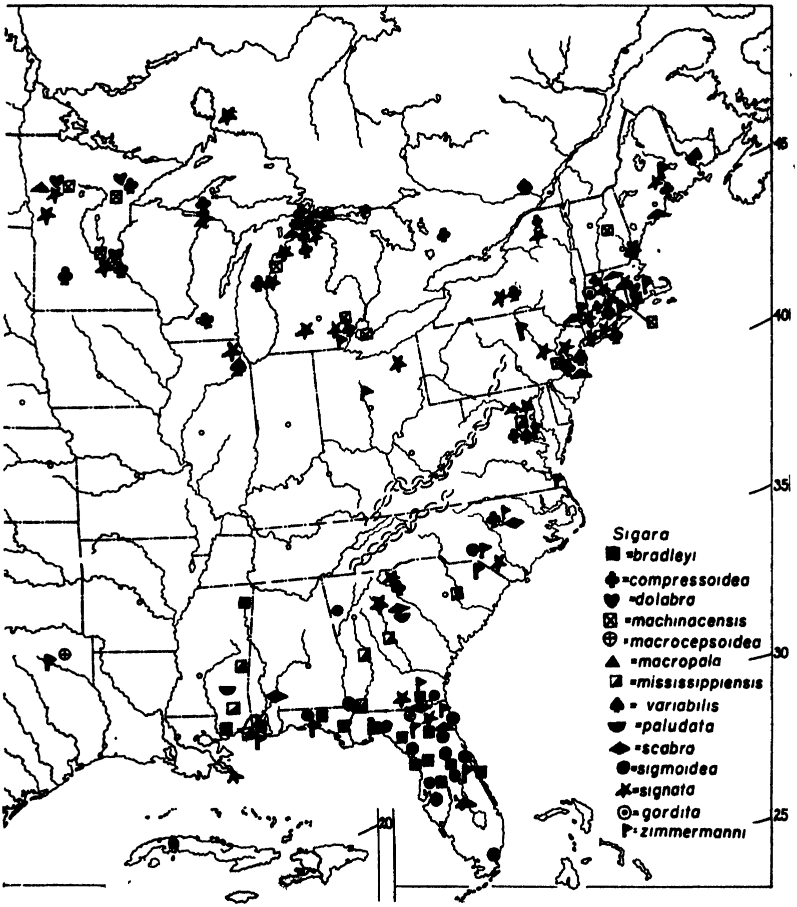

3e

PLATE CIV


Sigara
■ =bradleyi
♣ =compressoidea
♥ =dolabra
☒ =machinacensis
⊕ =macrocepsoidea
▲ =macropala
◪ =mississippiensis
♠ = variabilis
◒ =paludata
◆ =scabra
● =sigmoidea
✶ =signata
⊙ = gordita
⚑ = zimmermanni
45
40
35
30
25
20

The Subgenus *Sigara Tropocorixa* Hutchinson

1940. *Corixa (Tropocorixa)* Hutchinson, G. Evelyn. "A Revision of the Corixidae of India and Adjacent Regions." Trans. Conn. Acad. Arts and Sci., Vol. 33, pp. 389-476. (Description of subgenus p. 418.)

"Elytra smooth or feebly rastrate, elytral pattern vermiculate, not confluent to form marked longitudinal stripes, dark markings usually transgressing apex of ectocorium, posterior femur with few dorsal spines, ventral pubescence reaching at least to center of midline of femur, its margin sigmoid; male with moderate or obsolete facial impression, pala simple cultrate, subparallel or triangular, pegs in a single, centrally uninflected and unbroken row; strigil moderate or narrow, always present;* right paramere very broad throughout, or markedly crested in the distal half, the maximum width of which is always at least a half and usually almost equal to the maximum width of the proximal half.

"*Corixa kennecottii* Uhler, a common North American species, . . . resembles species of *Tropocorixa* in the anterior leg and genitalia; it is, however, more rastrate with rather long elytral hairs, and more inflated in the pleural region of the thorax than any species of *Tropocorixa* examined, and differs markedly in the immense triple row of spines on the hind femur, and the prestrigilar spines on the right side of the fifth abdominal segment. On the basis of the latter characters *Tropocorixa* may be separated from *Hesperocorixa*." **

Tropocorixa Hutchinson bears some resemblance to *Hesperocorixa* Kirkaldy in that males of many species have structural modifications of the tip of the ninth segment, and some also possess a tubercle or carina at the base of the male pala. The *Hesperocorixa* are, however, more heavily rastrate, and differ also in having the pruinose area of the embolar groove posterior to the nodal furrow relatively much longer than the pruinose area of the claval suture. In *Tropocorixa* the exact opposite obtains in all but two species, and in these two the pruinose areas of the embolar groove and of the claval suture are almost equal in length. Moreover, in *Hesperocorixa* the metaxyphus is fairly large, usually long and arrow-shaped, while in *Tropocorixa* it is nearly always broader than long and small. *Tropocorixa* lacks also the spiniform tuft of hairs at the apex of the male tibia so characteristic of *Corixa* Geoffroy and

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* Not true in the case of *Tropocorixa jensen-haarupi* Jacz. which has no strigil. Other characteristics, however, place it in this group. There is also an oriental species that lacks the strigil.

** P. 413, Hutchinson's paper.

Hesperocorixa Kirkaldy. For color pattern characteristics of this subgenus see wash drawing No. 1, Plate IV.

Subgenotype: *Corixa promontoria* Distant.

This interesting group of *Sigara* has representatives in New Zealand, Tasmania, Australia, the East Indies, India, China, Madagascar, Africa and South America. It is abundantly represented in South America where some of the species show considerable variation in the right genital clasper as shown by Doctor Jaczewski for *S.* (*T.*)*chrostowskii*, *S.* (*T.*) *dita* and others. Thus we have attempted to determine the limits of variation of this character and used other characters also in delimiting these difficult species.

KEY TO *SIGARA TROPOCORIXA* HUTCHINSON

1. Interocular space equal to the width of an eye.............. 2
Interocular space narrower than the width of an eye.............. 8

2. (1) Metaxyphus plainly broader than long.............. 3
Metaxyphus as broad as long to longer than broad.............. 5

3. (2) Pruinose area of the claval suture plainly longer than the post-nodal pruinose area.............. *S.* (*T.*) *rubyæ* (Hungfd.) (page 765)
Pruinose area of the claval suture about equal to the post-nodal pruinose area.. 4

4. (3) Male pala broadest at base; right clasper as on Plate CX, fig. 4c *S* (*T.*) *densconscripta* (Bied.) (page 767)
Male pala of uniform width; right clasper as on Plate CVI, fig. 4a. *S.* (*T*) *schadei* (Hungfd.) (page 769)

5. (2) Species more than 7.3 mm. long, middle femur spinose. *S.* (*T.*) *trimaculata* (Le Guil.) (= *fazi* Hungerford) (page 770)
Species less than 7.3 mm. long; middle femur not spinose.............. 6

6. (5) Post-nodal pruinose area equal in length to that of the claval suture; front femur of male with a small projection on the ventral margin. *S.* (*T.*) *femordens* Hungfd (page 772)
Post-nodal pruinose area shorter than that of the claval suture; front femur of male without a projection on ventral margin.............. 7

7. (6) Front femur of male without a stridular area; male structures as on Plate CXI. *S.* (*T.*) *bolivienses* Hungfd. (page 774)
Front femur of male with a stridular area; male structures as on Plate CIX, figs. 1-1g.............. *S.* (*T.*) *czakii* Jacz. (page 775)

8. (1) Infraocular width of genae at level of the hypo-ocular suture as great as the diameter of the middle femur.............. *S* (*T.*) *forciceps* (Spinola) (page 776)
Infraocular width of genae at level of the hypo-ocular suture less than the diameter of the middle femur.............. 9

9. (8) Metaxyphus plainly broader than long.............. 10
Metaxyphus as broad as long to longer than broad.............. 20

10. (9) Pronotal disk laterally reduced.............. *S.* (*T.*) *termasensis* (Hungfd.) (page 780)
Pronotal disk not laterally reduced.............. 11

11. (10) Male abdomen with a strigil.............. 12
Male abdomen without a strigil.............. *S.* (*T.*) *jensen-haarupi* Jacz. (page 781)

12. (11) Front femur of male without a stridular area 13

Front femur of male with a stridular area 15

13. (12) Post-nodal pruinose area equal to or slightly longer than that of the claval suture; male fovea plainly defined. 14

Post-nodal pruinose area shorter than that of the claval suture; male fovea poorly defined .... *S.* (*T.*) *roberti* n. sp. (page 783)

14. (13) Male with dorso-lateral margin of fovea fringed with long hairs; right clasper as on Plate CV, fig 2c .... *S.* (*T.*) *hungerfordi* Jacz. (page 784)

Male without long hairs on the dorso-lateral margin of the fovea; right clasper as on Plate CV, fig. 3c .... *S.* (*T.*) *braziliensis* n. sp (page 785)

15. (12) Vertex considerably produced in both sexes, rather abruptly projecting beyond curve of eyes, right clasper as on Plate CX, fig. 1d. *S.* (*T.*) *hosfordæ* (Hungfd.) (page 786)

Vertex smoothly curved and in line with the curve of the eyes, even where slightly produced; clasper not as above 16

16. (15) Males with right margin of the seventh abdominal segment not angulate or produced 17

Males with right margin of the seventh abdominal segment angulate or produced 18

17 (16) Median lobe of the seventh abdominal segment of males without a fringe of hairs; right clasper as on Plate CVIII, fig 3b, *S* (*T.*) *santiagiensis* (Hungfd.) (page 788)

Median lobe of the seventh abdominal segment of males with a fringe of hairs; right clasper as on Plate CVIII, fig 1b .... *S* (*T*) *dita* Jaczewski (page 789)

18 (16) Right margin of the seventh abdominal segment with two angles as on plate CVII, fig. 2c .... *S.* (*T*) *egbertæ* n. sp. (page 790)

Not as above 19

19 (18) Right clasper as on Plate CVI, fig 2a .... *S* (*T*) *chrostowskii* Jacz.* (page 792)

Right clasper as on Plate CVI, fig. 3a. *S.* (*T.*) *townsendi* (Hungfd.) (page 795)

20. (9) Vertex of male triangularly produced *S* (*T*) *denseconscriptoidea* (Hungfd) (page 796)

Vertex of male not produced .. *S* (*T*) *argentinensis* n sp. (page 798)

Sigara (*Tropocorixa*) *rehi* Jaczewski (see page 779) is not included in the above key since we had no specimens to check against characters used in the key. According to Doctor Jaczewski, it is structurally close to *S.* (*T.*) *forciceps* (Spinola). Reproductions of Jaczewski's drawings appear on Plate CX, figs. 3, 3a and 3b.

Sigara (*Tropocorixa*) *rubyæ* (Hungerford) 1928

(Plate CVII, figs. 1, 1a-1c)

1928. ***Arctocorixa rubyi*** **Hungerford, H. B. Bull. Brooklyn Ent. Soc XXIII, p 175, Pl. VI, figs. 5 and 8. (Buenos Aires, Argentina.)**

1930. ***Sigara rubyi*****, Jaczewski, T. Mitteilungen aus dem Zool. Staatinst und Zool. Mus., Hamburg, Band XLIV, pp. 145-146, figs. 5-7. (Argentina.)**

1933. ***Sigara rubyae*****, Jaczewski, T. Ann. Mus. Zool. Pol., Tom. IX, Nr. 21, p. 333. (Uruguay.)**

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* ***Sigara*** **(*T.*)** ***brachypala*** **(Hungfd.) is very close to *chrostowskii*, differing only in the shape of the pala. Since the specimen designated as holotype is slightly teneral, it may well be that *brachypala* falls within the limits of variation for *chrostowskii* as we have found nonteneral forms of the latter with palae similar to that shown for *brachypala*. For this reason, we do not attempt to key out *brachypala*. Drawings, however, appear on the same plate with those of *chrostowskii* and *townsendi*.**

Size: Length 6.3 mm. to 7.4 mm. Width of head across eyes 1.8 mm. to 2.2 mm.

Color: General facies medium brown. Pronotum crossed by 6 to 8 dark bands, usually slightly narrower than pale interspaces. Hemelytral pattern not barred except the basal portion of the clavus, vermiculate elsewhere; pigment of even distribution between light and dark. Embolium, head, limbs, and venter pale, except basal segments of abdomen which are smoky.

Structural characteristics: Head two-thirds as long as pronotal disk; vertex slightly produced beyond margin of eyes, as seen from above, in both sexes; interocular space equal to or greater than the width of an eye; facial hairs few; male fovea broad, shallow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 20 ♂ ; 1 : 2 : 3 : 4 :: 20 : 15 : 40 : 20 ♀. Pronotal disk with median carina faintly visible on anterior fourth; rounded apically. Pronotum finely rastrate; hemelytra nonrastrate, shining, with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow much shorter than the pruinose area of the claval suture. Lateral lobe of prothorax about half as broad at base as long, sides nearly parallel, tip trapezoidal; mesoepimeron narrow with osteole near tip; metaxyphus broader than long, broadly rounded at apex. Front leg of female of usual shape. Front leg of male: pala cultrate, tubercle or carina present at base on dorsal margin, 30 pegs in curved row, those at distal end longer and more pointed than basal ones; tibia about two-thirds as long as pala, pronounced dorsal carina terminating apically in oval pad; femur slender, margins nearly parallel, with about 9 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with rows of stout spines; segmental proportions as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 47 : 33.8 : 45.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 84.2 : 120.9 : 73.6. Male asymmetry dextral; strigil small, oval, of 5 regular combs. Caudal margin of sixth abdominal segment sinuous. Right margin of seventh abdominal segment triangularly produced. For details of male abdomen, pala, and genitalia see Plate CVII, figs. 1, 1a, 1b and 1c.

Comparative notes: This species may be separated from all other *Tropocorixa* from South America except *denseconscripta* (Bredd.) by having the interocular space greater than the width of an eye, and from the latter species by having the pruinose area of the embolium posterior to the nodal furrow much shorter than the pruinose area of the claval suture, whereas in *denseconscripta* it is longer.

Location of types: Described from 1 male (holotype), 1 female (allotype) and 2 females paratypes labeled "Buenos Aires, Mercedes, 11/19/23, R. Hosford" in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.)

ARGENTINA: La Granja, Alta Gracia, Córdoba, 1923, A. Bruch, 24 males, 48 females; center of city of Buenos Aires, Carlos Reed, 5 females.

Sigara (*Tropocorixa*) *denseconscripta* (Breddin)

(Plate CX, figs. 4, 4a-4c)

1897. *Corixa denseconscripta* Breddin, G. Hamburger Magalhaensiche Sammelreise Hemipteren, p. 16, figs 7, 7a-b. (Argentina, ♀ type).

1899. *Corixa denseconscripta*, Kirkaldy, G. W. Bolletino Musei de Zoologia ed Anatomia Comparata Univ. di Turino XIV, No. 351, pp. 3-4, figs 10, 11, 12. (Desc. ♂, records Paraguay, Asuncion, Argentine, Tucuman, San Pablo.)

1909. *Arctocorisa denseconscripta*, Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue *in* Proc Ent. Soc. Wash. X, p 195.

1927. *Sigara* (*Sigara*) *denseconscripta*, Jaczewski, T Ann. Zool. Mus. Nat. Hist. VI, No. 3, pp 251-253, Pl. VII, figs. 1, 4 and 7, Pl. VIII, fig. 8 (Give additional desc. of ♂.)

1928. *Arctocorixa denseconscripta*, Hungerford, H. B. Bull. Brooklyn Ent. Soc. XXIII, p. 179, Pl. VI, fig. 11.

1928. *Sigara* (*Sigara*) *denseconscripta*, Jaczewski, T. Ann. Mus. Nat. Hung. XXV, pp. 212-213. (Additional Argentina records.)

1930. *Sigara denseconscripta*, Jaczewski, T. Mitteil. aus dem Zool. Staatsinstitut und Zool. Mus. in Hamburg, XLIV, p. 145. (Records Brazil.)

Size: Length 6.7 mm. to 6.9 mm.* Width of head across eyes 2 mm. to 2.1 mm.

Color: General facies medium brown. Pronotum crossed by about 8 to 10 brown bands. The anterior pale transverse lines are usually wider than the remaining ones, and in some specimens they are confluent with each other, the whole anterior portion of the disk being then widely and uniformly pale. Hemelytral pattern variable in more or less transverse series, but wavy and broken throughout. Corium and membrane separated by pale line. Embolium, head, limbs and venter pale.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex rounded out beyond eyes as seen from above; interocular space equal to or slightly broader than the width of an eye; facial hairs few; male fovea narrow and deep; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 22 : 15 : 40 : 22 males; 1 : 2 : 3 : 4 :: 23 : 18 : 37 : 20 females. Pronotal disk about two-thirds

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* Breddin gives Long. 7½-8 mm. and Jaczewski, 1927, gives 7-7.25 mm.

as long as broad, median carina visible on anterior third, disk angulate apically, narrowed laterally, pronotum finely rastrate, hemelytra rugulose, with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow slightly longer than the pruinose area of the claval suture. Lateral lobe of prothorax about half as wide at base as long, rounded apically; mesoepimeron narrow with osteole near tip; metaxyphus broader than long, rounded apically. Front leg of female of typical shape. Front leg of male: Pala obliquely truncate apically, broadest near base, with a small carina on dorsum at base, about 30 pegs, the first 15 or 20 short and parallel to upper palmar row of bristles, the distal 10 or 12 pegs elongate and obliquely placed, an auxiliary row of short bristles above peg row; tibia about half as long as pala, with a short carina terminating distally in a pad; femur slender, with about 9 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with stout spines; segmental proportions: Middle leg: femur : tibia : tarsus : claw :: 100 : 41.5 : 32.9 : 38.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.7 : 108.9 : 44.6.† Male asymmetry dextral; strigil oblong, of 4 to 5 regular combs, located at end of a pedicel reaching almost to rear margin of seventh abdominal segment. Right margin of seventh abdominal segment with a rounded projection. Genital capsule with a short, finger-like projection at inner base of the process of the ninth segment. Tip of right clasper bizarre in shape, with three flap-like projections. For details of male pala, abdomen, and genitalia see Plate CX, figs. 4, 4a, 4b and 4c.

Comparative notes: This species is near *S.* (*T.*) *denseconscriptoidea* (Hungerford) in respect to the right clasper of the male but is distinct in several characters as shown on Plate CX.

Location of type: Supposed to be in the museum at Hamburg, Germany, but not found by me in 1928. Breddin described the species from a single female labeled "Coll. Mich. 203 Buenos Aires, Barracas del Sur, Süsswasser Gräben: 26, VII, 93."

Data on distribution: (Plate CXII.)

BOLIVIA: Villa Montes, Nov., 1917, 1 male; Puerta Suarez, J. Steinback, 2 females.

PARAGUAY: Asunción, 1 male.

URUGUAY: Mendoza, C. S. Reed (Cornell U. Coll.), 1 male; Prov.

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† Jaczewski gives: Middle leg: 100 : 48.5 : 31.8 : 42.4; Hind leg: 100 : 100 : 118.9 : 52.8.

de Mendoza, male on slide prepared by Doctor Jaczewski and given to me by Mr. Jensen-Haarup.

ARGENTINA: Monte, March 2, 1909 (Carnegie Mus. Coll.), 3 males, 12 females; La Granja, Alta Gracia, Córdoba, 1923, A. Bruch, 3 males, 3 females; Argentina, Jensen-Haarup (gift Helsingfors Mus.), 2 males, 4 females; Villa Ana, F. C. S. Fe, Dec., 1924, K. J. Hayward, 2 females; Tucumán Prov., Jan., 1902 (British Mus.), 1 male; San Pablo, Tucumán, 1 male; Buenos Aires, Nov. 23, 1938, C. J. Drake, 2 males, 1 female (Drake Coll.); Sanctí Spíritu, Jan. 9, 1939, same collector and collection, 1 female; Pico, Sept 9, 1940 (U. S. N. M.), 1 male, 1 female.

Sigara (*Tropocorixa*) *schadei* (Hungerford) 1928

(Plate CVI, figs. 4, 4a-4d)

1928. *Arctocorixa rubyi* var *schadei* Hungerford, H. B Bull Brooklyn Ent Soc , XXIII, p. 176. (Paraguay.)

Size: Length 5.9 to 6.7 mm. Width of head across eyes 1.8 to 2 mm.

Color: General facies a little lighter than medium. Pronotum crossed by 6 or 7 dark bands. Pattern of hemelytra consisting of narrow, dark, vermiculate figures on a pale background without cross bars except at the base of clavus in some specimens. Pale areas predominant over dark ones. Embolium, head, limbs and venter pale.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex, as seen from above, rounded out beyond margin of eyes in both sexes; interocular space about equal to the width of an eye; facial hairs few; male fovea narrow, shallow, poorly defined; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 14 : 41 : 22 ♂ ; 1 : 2 : 3 : 4 :: 20 : 15 : 38 : 25 ♀ . Pronotal disk with median carina faintly visible on anterior fourth; angulate apically; pronotum faintly rastrate and hemelytra faintly rugulose, nonrastrate, membrane shining; hemelytra with a few pale, short hairs. Pruinose area of embolar groove posterior to nodal furrow slightly shorter than the pruinose area of the claval suture. Lateral lobe of prothorax about half as wide at base as long, sides nearly parallel, apex rounded; mesoepimeron narrow with osteole near tip; metaxyphus broader than long, tip broadly rounded. Front leg of female of typical shape. Front leg of male: pala cultrate, upper and lower margins almost parallel, small tubercle present on dorsal margin at base, 38 to 40 pegs in curved row, apical ones longer than basal ones; tibia about two-thirds as long as pala, short dorsal carina, terminating apically in a pad; femur slender, sides almost parallel, with a small patch of about 8 rows of stridulatory pegs on inner surface, dorsal margin at base with a patch of long hairs. Middle and hind legs slender; middle femur not armed with stout spines; segmental proportions:

Middle leg: femur : tibia : tarsus : claw :: 100 : 46. 2 : 31.3 : 49.2; hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 91.5 : 114.4 : 40. Male asymmetry dextral; strigil small, of 6 regular combs; caudal margin of sixth abdominal segment nearly straight; right margin of seventh abdominal segment sinuous. Right clasper of male genital capsule with several flap-like projections near and at tip. For details of male structures see Plate CVI, figs. 4, 4a, 4b, 4c and 4d.

Comparative notes: Though closely allied to S. (*T.*) *rubyæ* (Hungfd.), this species may be separated from it by having a shorter pruinose area along the claval suture.

Location of types: Holotype male, allotype female and 1 male paratype labeled "Paraguay, South America, Villarico, Dec. 28, 1924 and July 8, 1924, F. Shade," in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.) Besides the types we have the following:

CHILE: Termas Cauquenes, Dec. 15, 1922, Alfredo Faz, 1 female.

URUGUAY: Montevideo (P. R. Uhler Coll.), 1 male, 2 females; Mendoza, C. S. Reed (Cornell U. Lot 605), 1 female.

ARGENTINA: Chaco de Santiago del Estero, Río Salado, December, 1 female; Villa Ana, F. C. S. Fe, Dec., 1925, K. J. Hayward, 1 male; Resistencia, Chaco, to Santiago del Estero, April 4-9, 1940, H. M. Parker (U. S. N. M.), 1 male; "Salta, Metan," Departamento Metán, Prov. de Salta, 1 male, 1 female; Buenos Aires, Nov. 23, 1938, C. J. Drake, 1 male (Drake Coll.); La Colina, Buenos Aires, Nov. 29, 1938, same collector, 1 male, 2 females (Drake Coll.); Pico, Sept. 9, 1940 (U. S. N. M.), 1 male, 2 females.

Sigara (*Tropocorixa*) *trimaculata* (Le Guillou)

(Plate CVII, figs. 8, 8a to 8c)

1841. *Corixa trimaculata* Le Guillou (E. J. F.). Rev. Zoologique par la Societe Cuvierienne 1841, p. 268.

1851. *Corisa maculata* Fieber, F. X. Species Generis Corisa, Prague, p. 45. (Lists this under works unknown to him and credits the species to "A. L. Guillon in Revue Zoolog., p. 261," thus misnaming both the species and the author.)

1853. *Corisa maculata*, Herrich-Schäffer, G. A. W. Index Ins. Hemiptera, Regensburg, p. 69. (Cat. according to Jaczewski, 1933.)

1853. *Corixa maculata,* Herrich-Schäffer, G. A. W. Wanzen Ins. IX, p. 54, Tab. CCXCVI, Fg. 920.

1859. *Corixa maculata,* Dohrn, H. Cat. Hemipt. Stettin, p. 55. (Cat. according to Jaczewski 1933.)

1868. *Corixa trimaculata,* Signoret, V. Ann. Soc. Ent. Fr., Paris (4), III, p. 581 (copies orig. desc.).

1909. *Arctocorixa maculata,* Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue in Proc. Ent. Soc. Wash. X, p. 196.

1928. *Arctocorixa fazi,* Hungerford, H. B. Bull. Brooklyn Ent. Soc. XXIII, p. 178, Pl. VI, fig. 12.

1933. *Sigara trimaculata,* Jaczewski, T. Ann. Mus. Zool. Pol. IX, No. 21, pp. 331-332, Pl. XLVI, figs. 6-8. (Redesc. type and says *A. fazi* Hungerford is syn)

1935. *Sigara trimaculata,* de Carlo, Jose A. Revista Chilena de Historia Natural, pp. 108, 109. (Catalogue.)

Size: Length 7.3 mm. to 7.6 mm. Width of head across eyes 2.3 mm. to 2.5 mm.

Color: General facies medium to dark. Pronotum crossed by 7 to 8 fairly regular brown bands which are equal to or narrower than pale interspaces. Base of clavus irregularly cross-banded; pattern elsewhere vermiculate. brown and pale pigment about even in distribution. Pale line separating membrane from corium. Embolium smoky. Head and abdominal venter smoky; limbs and thoracic venter pale.

Structural characteristics: Head about half as long as pronotal disk; vertex rounded as seen from above in both sexes; facial hairs few; male fovea narrow and shallow, not well defined; interocular space equal to or a little less than the width of an eye; antennal segmentation: 1 : 2 : 3 : 4 :: 23 : 18 : 43 : 32 males; 1 : 2 : 3 : 4 :: 24 : 20 : 43 : 33 females. Pronotal disk with median carina on anterior third; finely rastrate, rounded apically; hemelytra faintly rugulose, membrane shining, with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow a little shorter than the pruinose area of the claval suture. Lateral lobe of prothorax three-fourths as wide at base as long, rounded apically; mesoepimeron narrow with osteole near tip; metaxyphus longer than broad, tip broadly rounded. Front leg of female of usual shape. Front leg of male: Pala elongate with upper and lower margins nearly parallel, 30 pegs in curved row, base of pala with a small tubercle on dorsal surface; tibia about half as long as pala, with a short dorsal carina and a pad; femur slender with 9 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur armed with several rows of stout spines in both sexes; segmental proportions:

Middle leg: femur : tibia : tarsus : claw :: 100 : 37.5 : 24.2 : 37.5. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 88.9 :

109.4 : 38.5. Male asymmetry dextral; strigil large, elongate, of 8 or 9 narrow, irregular combs; median lobe of seventh abdominal segment a broad, triangular plate; right margin of same segment with a small triangular projection. For details of male pala, abdomen, and genitalia see Plate CVII, figs. 3, 3a, 3b and 3c.

Comparative notes: This species may be separated from all S. A. *Tropocorixa,* except *jensen-haarupi* Jacz., by having the femora of the middle leg armed with several rows of stout spines, and from the latter species by reason of its large size, being, in fact, the largest of this group.

Location of types: In 1928 I found in the Paris Museum an old dilapidated specimen of my *A. fazi* bearing a written label "*Corixa trimaculata* Le G., St. Cristoval, Chili." I took this to be Le Guillou's type but the specimen is a long way from being 10 mm. long as described by Le Guillou, even in its stretched out condition! I was quite shocked for M. Le Guillou had given the following description: "18. *Corixa trimaculata.* Capite brunco; elytris subnigris (sic.); punctis fuscis numerosissimis; tribus maculis bruneis cerca apicem (L. 10 m., larg. 2⅔ mm. Hab. le Chili)." I was expecting, therefore, a species nearly as large as *H. interupta* (Say) of North America. Jaczewski 1933 also examined this male type and reported that *S. fazi* Hungerford is a synonym. Types of *A. fazi* Hungfd. in the University of Kansas collections.

Data on distribution: (Plate CXII.)

CHILE: Limache, A. Faz, 5 males, 14 females; Santiago, Alfredo Faz, 2 females; Prov. Valparaiso, A. Faz, 3 females; Termas Cauquenes, Dec. 15, 1922, Alfredo Faz, 168 males, 202 females.

BRAZIL: Porto Alegre, Herm. Soyaux leg., ded. 23, X, 1901, 1 female.

PARAGUAY: Horqueta, Dec. 7, 1934, Alberto Schulze, 6 females (Drake Coll.).

Sigara (Tropocorixa) femoridens Hungerford 1939

(Plate CXI, 8 figures)

1939. *Sigara femoridens* Hungerford, H. B. Jl. Kans. Ent Soc Vol. XV, No. 3, p. 97, 1 pl.

Size: Length 6.3 mm. to 6.7 mm. Width of head 2.1 mm. to 2.3 mm.

Color: General facies medium brown. Pronotum crossed by 10 narrow dark lines, some of them not quite reaching to lateral margins of disk. Dark pattern of hemelytra reticulate, in narrow, wavy lines; corium and membrane indistinctly separated by brownish line; pattern of membrane reticulate. Embolium, head, and limbs pale; abdominal venter smoky in males, pale in females.

Structural characteristics: Head of male two-thirds as long as pronotal disk, that of female half as long; postocular space broadest at inner angles of eyes; interocular space equal to or slightly greater than the width of an eye; vertex of male projecting beyond curve of eyes as seen from above; faces with a few long hairs; male fovea deep, rather broad, not quite attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 30 : 20 : 40 : 30 ♀. Pronotal disk broad and somewhat reduced laterally (colored portion not extending quite as far laterad as basal angles of clavus); apex rounded, faint median carina on anterior fourth of disk; pronotum and hemelytra nonrastrate, somewhat rugulose, the hemelytra with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow equal in length to that of claval suture. Lateral lobe of prothorax elongate, sides parallel, apex rounded and anteriorly depressed; mesoepimeron narrow with osteole near the tip; metaxyphus slightly longer than broad, tongue-shaped, the apex blunt. Front leg of female of usual shape. Front leg of male: pala cultrate, fairly broad, not carinate on outside near base, with about 35 pegs in a row half way between dorsal margin and palm; tibia about half as long as pala, with a short dorsal carina and a small pad; femur slender, without stridulatory teeth, and with the ventral margin angulate near apex. (See Plate CXI.) Middle and hind legs slender; middle femur not spinose. Segmental proportions as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.3 : 32.3 : 41.6. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 92.1 : 112.4 : 47.3. Male asymmetry dextral. Strigil small, elongate, of 3 regular combs. Right margin of seventh abdominal segment not produced. Right clasper of male genital capsule forked apically. For details of male structures see Plate CXI. Female abdomen normal.

Comparative notes: The male genitalia shows relation to that of *T. denseconscripta* (Breddin) and *T. denseconscriptoidea* (Hungerford), but may be separated from them by having the pronotal disk reduced. It may be separated from *T. termasensis* (Hungerford), which also has a reduced pronotum, by the shape of the male right clasper.

Location of types: Holotype male, allotype female, and 3 male and 1 female paratypes labeled "Cochabamba, Bolivia, S. A., March, 1938, A. M. Olalla" in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.) Known to us only by the type series.

Sigara (*Tropocorixa*) *boliviensis* Hungerford 1939

(Plate CXI, 3 figures)

1939. *Sigara boliviensis* Hungerford, H. B. Jl. Kans. Ent. Soc., Vol. XII, No. 3, pp. 97-99, 1 pl. (Bolivia.)

Size: Length 5.5 mm. Width across eyes 1.9 mm.

Color: General facies light brown. Pronotum crossed by 7 to 8 narrow dark bands, anterior ones interrupted and irregular as to thickness, only the first two bands extending to margins of pronotal disk. Dark pattern of clavus transverse at base, composed of irregular, zigzag lines elsewhere. Corial pattern of equally distributed splotches of light and dark arranged in faintly longitudinal series. Corium separated by pale line from membrane which has reticulate pattern. Embolium smoky; head and limbs pale; venter smoky with pale margins.

Structural characteristics: Head about two-thirds as long as pronotal disk; interocular space equal to or slightly exceeding the width of an eye; vertex slightly produced beyond curve of eyes; face not hairy; male fovea fairly shallow and narrow, not attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 15 : 32 : 20 ♂. Pronotal disk not reduced, broad laterally, rounded apically; median carina on anterior fourth; pronotum and hemelytra finely rastrate, the latter with scattered pale hairs; pruinose area of embolar groove posterior to nodal furrow shorter than that of the claval suture. Lateral lobe of prothorax elongate, sides nearly parallel, rounded apically, its anterior angle produced; mesoepimeron narrow with osteole near the tip; metaxyphus about as broad as long, apex blunt. Front leg of male: pala cultrate, faintly carinate on outside, with 24 pegs in a single, slightly curving row midway between dorsal margin and palm; tibia about half as long as pala, with a short dorsal carina and a small, semioval pad; femur relatively slender, without stridulatory pegs on inner surface and with ventral margin not produced. Middle and hind legs slender, average segmental proportions:

Middle leg: Femur : tibia : tarsus : claw :: 100 : 46.8 : 33.4 : 46.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 85.8 : 114.4 : 42.9. Male asymmetry dextral; strigil small, almost round, of 4 regular combs. Right margin of seventh abdominal segment not produced. For details of male structures see Plate CXI.

Comparative notes: This species is very close to *T. dita* Jacz., but is larger, has a broader interocular space and has the claw of the middle leg equal to the tibia instead of longer. Also, the males of *T. dita* can stridulate.

Location of types: Holotype male labeled "Colimi, Bolivia, S. A., April, 1938, A. M. Olalla" in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.) Known only by the type.

Sigara (*Tropocorixa*) *czakii* Jaczewski

(Plate CIX, figs. 1, 1a-1g)

1927. *Sigara* (*Sigara*) *czakii* Jaczewski, T. Ann. Zool. Mus Pol Hist Nat. VI, No 1, pp 50-53, figs. 19-26.

1928. *Arctocorixa czakii*, Hungerford, H. B. Bull. Brooklyn Ent. Soc. XXIII, p. 179, Pl. VI, fig. 2.

The following description is based upon that of Jaczewski.

Size: 5 mm.

Color: General facies rather dark. The pronotal disk with fewer pale lines on it than in *S.* (*T.*) *dita* Jaczewski which has 8 to 9. *Czakii* has 6 to 7 almost regular, narrow, pale transverse lines. The pale pattern of the hemelytra resemble in general that of *S.* (*T.*) *dita* but the pale markings are narrower and more remotely disposed; some pale transverse lines at the base of the clavus are wider and almost entire. Membranal suture marked by an oblique pale line. Membrane showing rather few zigzag-like pale markings, its apical and outer margins dark. Inner portion of the left membrane pale transparent. Marginal area darkened, at its end the outer margin of the hemelytra is still darker, being again pale about the apical corial angle. The pale pattern of the pronotal disk and of the hemelytra does not dominate over the dark color.

Structural characteristics: Head, when seen from above, equal in length to about four-fifths of the length of the pronotal disk. Frontal arch almost equally prominent in both sexes. Facial impression of the male comparatively feeble and shallow, indistinctly limited above. Face almost glabrous in both sexes. Fourth antennal segment equals in length sixty percent of the length of the third. Pronotal disk slightly shorter than in *S.* (*T.*) *dita,* its length somewhat longer than half of its breadth. Lateral angles rounded. Pronotal keel distinctly visible on the anterior half of the disk, posteriorly gradually disappearing. Pronotal disk and base of hemelytra distinctly rastrate. Pubescence of hemelytra sparce. Lateral lobe of prothorax tongue-shaped, rounded at apex. Metaxyphus at least as long as broad, blunt at apex with straight lateral margins. Front leg of female of usual shape. Front leg of male: pala cultrate as shown in text figure with 26 to 28 pegs in a row, the terminal ones longer. Middle leg: femur : tibia : tarsus : claw :: 100 : 50 : 38.8 : 42.9. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 91.4 : 103.4 : 50. On the upper surface of the posterior femur some few isolated short spines. Strigil not very small, nearly round in its outline, with 6 to 7 partly abbreviated and interrupted combs. Right clasper distinctly widened in the terminal part, beneath the end with a small emargination and a tooth just behind it. Left clasper wide.

Comparative notes: This species can be distinguished from *S.* (*T.*) *dita* by its shorter pronotal disk with fewer pale lines on it, by the slightly shorter intermediate claws, by the more feeble facial impression in the male, by the much larger strigil, and by the shape of the right clasper.

Location of type: Described from at least two males and several females from Ponta Grossa, Río da Areia, Paraná, Brazil. Types in the Polish Museum.

Data on distribution: (Plate CIX.) We have studied a single male specimen from São Paulo, Brazil, sent us by the Brazil Museum. The following notes may be added to the original description:

The interocular space is equal to the width of an eye. The head is less than four-fifths the pronotal disk, nearer half that length. The pruinose area beyond the nodal furrow is about half as long as that of the claval suture. The mesoepimeron is narrow with the osteole near its tip. The metaxyphus is plainly longer than broad. The front tibia of the male with a small pad. Reproductions of Jaczewski's drawings, together with drawings made of the above-mentioned male specimen, may be found on Plate CIX, figs. 1 to 1g.

Sigara (*Tropocorixa*) *forciceps* (Spinola)*

(Plate CX, figs 2, 2a-2e)

1852. *Corixa forciceps* Spinola, M. M., *in* Gay's Historia Fisica y Politica de Chile Zool. VII, p. 281.

1863. *Corixa forciceps,* Signoret, V. Ann Soc. Ent. Fr. (Paris), 4 ser. III, p 581.

1879 *Corixa forciceps*, Berg C. Hem. Arg. Bonariae, Hamburgo, p. 201. (Records from Argentina.)

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* Spinola described this from Chile and as pointed out by Doctor Jaczewski, 1931, our concept of this species is based upon Berg's assertion (1879) that the Argentine specimens he studied are identical with those from Chile. However, we have never seen specimens from Chile of what we here describe, nor can we locate Spinola's type which, according to Walther Horn, should be "im Castello di Tassarolo (Novi Ligure)."

1897. *Corixa forciceps,* Breddin, G. Erg. Hamb. Mag. Sammelreise Hemiptera. Hamburg. pp. 15-16, figs. 6, 6a-c. (Redesc.)

1899. *Corixa forciceps,* Kirkaldy, G. W. Bollettino Musei de Zool. ed Anat. Comp. Univ. di Torino XIV, No. 351. (Records Paraguay and Argentina.)

1909. *Arctocorisa forciceps,* Kirkaldy, G. W., and Torre-Bueno, J. R. de la. Catalogue in Proc. Ent. Soc. Wash. X, p. 195.

1927. *Sigara forciceps,* Jaczewski, T. Ann. Zool. Musei Polonici Hist. Nat. VI, No. 1, p. 58, fig. 36.

1928. *Arctocorixa forciceps,* Hungerford, H. B. Bull. Brooklyn Ent. Soc. XXIII, p. 179, Pl. VI, fig. 8.

1928. *Sigara (Sigara) forciceps,* Jaczewski, T. Ann. Musei Nat Hungarici XXV, p. 214. (Argentina and Paraguay.)

1930. *Sigara (Sigara) forciceps*, Jaczewski, T. Mitteil. Zool. Staatsinst. und Zool. Mus. Hamb. XLIV, p. 147.

1931. *Sigara forciceps,* Jaczewski, T. Ann. Musei Zool. Polonici IX, Nr. 10, p. 151, Tab. XIII, figs. 5 to 9.

1933. *Sigara forriceps,* Jaczewski, T. Ann Musei Zool. Polonici IX, Nr. 21, p. 332. (Lists Uruguay.)

1935. *Sigara forciceps*, De Carlo, J. A. Revista Chilena de Historia Natural, p. 108. (Catalogue.)

Size: Length 5 mm. to 6 mm. Width of head across eyes 1.8 mm. to 2 mm.

Color: General facies medium to dark. Pronotum crossed by 7 to 8 broad brown bands. Hemelytra dark with flecks of lighter color in faintly transverse series. In some specimens the distal portion of the corium is almost solid brown. Corium and membrane separated by a pale line. Embolium, head, limbs and venter pale.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex of male conically produced between eyes as seen from above; facial hairs few; infraocular width of the genae at the level of the hypo-ocular suture greater than the diameter of the middle femur; male fovea shallow, broad, but not attaining eyes laterally; interocular space narrower than the width of an eye; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 20 : 14 : 29 : 19 ♂ ; 1 : 2 : 3 : 4 :: 20 : 14 : 31 : 21 ♀. Pronotal disk short compared to width, with faint median carina on anterior third, rounded apically; finely rastrate. Hemelytra nonrastrate, faintly rugulose, with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow equal to or shorter than the pruinose area of the claval suture. Lateral lobe of the prothorax almost as broad as long, anterior distal angle produced, posterior angle rounded; mesoepimeron narrow with osteole near tip; metaxyphus small, broader than long, the apex forming almost a right angle, especially in female. Front leg of female of usual shape. Front leg of male: pala rounded on dorsal surface, cultrate, 30 pegs in an almost straight row; tibia about two-thirds as long as pala with a short dorsal carina and a pad; femur slender, sides nearly parallel, with about 8 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with stout spines; segmental proportions as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 38 : 32 : 36. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.9 : 119.9 : 46.6. Male asymmetry dextral; strigil large, almost round, with about 7 regular combs. Median lobe of seventh abdominal segment trapezoidal, without a fringe of hairs; right margin of same segment without an angular projection. For details of male pala, abdomen, and genitalia see Plate CX, figs. 2, 2a, 2b, 2c, 2d, and 2e.

Comparative notes: Structurally this species is close to *T. rehi* Jacz. and to *T. santiagiensis* (Hungfd.). It may be distinguished from the former by the shape of the male right clasper and the shape of the median lobe of the seventh abdominal segment of the male, and from the latter by the two characters already mentioned and the fact that the middle tibia is longer than the tarsal claw instead of being of equal length.

Location of types: Spinola's types are reported by Walther Horn to be in the Castello di Tassarolo (Novi Ligure).

Data on distribution: (Plate CXII.) We have the following before us:

Brazil: Nova Teutonia, Fritz Plauman (Usinger), 4 males, 11 females; nr. Porto Alegre, temp. pools in grasslands, Aug., 1941, H. Kleerekoper, 8 males, 5 females; Alto Paraná, Aug. 29, 1929, F. Schade, 1 male, 1 female; Nova Teutonia, Fritz Plauman (Helsingfors), 11 females.

URUGUAY: "Sweeping from Montevideo to Salto, S. A.," March 6-14, 1940, H. L. Parker, (Nat. Mus. Coll.), 2 males, 9 females.

PARAGUAY: Villa Rica, July 8, 1924, Loma, F. Schade, 12 males, 20 females; same place and collector (estero en queblo), July 16, 1923, 4 males, 10 females; same place and collector, Jan. 7, 1923, 4 males, 2 females; same place and collector, Sept. 24, 1924, 1 male, 4 females; same place and collector, Dec. 16, 1924, 1 male; same place and collector, Oct. 30, 1923, 6 males, 7 females; same place and collector, Nov. 4, 1923, 5 males, 12 females; same place and collector, Nov. 10, 1923, 1 female; same place and collector, Aug. 2, 1924, 3 females; same place and collector, Dec. 20, 1924, 1 female; same place and collector, Dec. 18, 1924, 5 females; same place and collector, Jan. 15, 1925, 2 females; same place and collector, Dec. 15, 1923, 5 males, 25 females; same place and collector, Aug. 8, 1924, 1 male; same place and collector, Oct. 30, 1924, 3 females; same place and collector, Oct. 29, 1929, 5 males, 6 females; Molinesque, June 20, 1935, same collector, 1 male, 4 females; Villa Rica, Sept. 20, 1925, same collector (Helsingfors), 1 male, 2 females; Horqueta, Dec. 7, 1934, Alberto Schulze, 1 male (Drake Coll.); Caraveni, Oct. 30, 1924, Francisco Schade, 6 males, 7 females; same place and collector, Dec. 18, 1924, 1 female.

ARGENTINA: Center of City of Buenos Aires, Carlos Reed, 14 males, 242 females; Tigre, B. A., Nov. 20, 1938, C. J. Drake, 1 male, 16 females (Drake Coll.); Buenos Aires, Nov. 23, 1938, same collector and collection, 9 females; Luján, B. A., Dec. 18, 1938, same collector and collection, 3 males, 5 females.

Sigara (*Tropocorixa*) *rehi* Jaczewski 1930

(Plate CX, figs 3, 3a and 3b after Jaczewski)

1930. *Sigara rehi* Jaczewski, T. Pub of Zool. Staatsinstitut Zool. Mus., Hamburg, 44, pp. 147-148. (Argentina.)

The following information is taken from Doctor Jaczewski's German description:

Size: 5.5 mm. long.

Color: General facies dark brown. Pronotum with 6 to 7 moderately regular pale yellow bands. Head, limbs, and venter yellow. Eyes dark.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex, seen from above, wider than an eye; face sparsely haired; male fovea rather deep and wide, but not attaining eyes laterally. Pronotum plainly rastrate, four-tenths wider than long, hemelytra smooth, shining; few hairs on hemelytra. Lateral lobe of prothorax ligulate, end rounded; metaxyphus short, tip blunt, lateral margins straight. Foreleg of male: pala rather small, cultrate, inner margin with 18 sieve hairs, stridulatory row of 25 pegs, smaller at base. Tibia toward the end three-edged, without a pad. Femur with a small field of thickened hairs on its front surface.

Middle claw clearly longer than its tarsus. Male asymmetry dextral, strigil round, of 6 somewhat irregular combs. Middle lobe of seventh abdominal segment triangular, somewhat broad. Right genital clasper relatively narrow. (See drawing.) Tip of ninth segment simple, flaps of penial sheath anchor-like. For details of male pala, abdomen, and right clasper see Plate CX, figs. 3, 3a and 3b. (Drawn after Jaczewski.)

Comparative notes: *T. rehi* Jacz. may be distinguished from all other S. A. *Tropocorixa,* except *T. forciceps* (Spin.), by the shape of the right genital clasper. It may be separated from *S.* (*T.*) *forciceps* (Spin.) by its small hypo-ocular space and the lighter color of its venter.

Location of types: Holotype male, "Buenos Aires, Fr. Beumer 1 male," in Hamburg State Institute of Zoology and Zoology Museum, Hamburg, Germany. (See Plate CXII.)

Sigara (*Tropocorixa*) *termasensis* (Hungerford)

(Plate CVIII, figs 4, 4a-4c)

1928 *Arctocorixa fazi* var. *termasensis* Hungerford, H. B. Bull. Brooklyn Ent Soc, XXIII, p. 178, Pl. VII, figs 7 and 10 (Chile).

1933. *Sigara termasensis,* Jaczewski, T. Ann. Mus Zool Pol, Tom IX, Nr 21, p 382 (Raised to specific rank.)

1935. *Sigara termasensis,* De Carlo, José A. Revista Chilena de Historia Natural, p 108 and 109. (Systematized catalog.)

Size: Length 5.7 mm. to 5.9 mm. Width of head 2 mm. to 2.1 mm

Color: General facies medium. Pronotum crossed by 7 or 8 fairly regular brown lines, narrower than pale interspaces. Hemelytra not cross-banded, except at base of clavus. Brown pigment of corium occasionally in faintly longitudinal series; pattern vermiculate. Embolium, head, and limbs pale. Thoracic venter suffused with brown; abdominal venter pale.

Structural characteristics: Head about half as long as pronotal disk; vertex rounded out beyond margin of eyes as seen from above; interocular space less than the width of an eye; facial hairs few; male fovea narrow but deeper than in *trimaculata* (Le G.); antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 15 : 37 : 28 males; 1 : 2 : 3 : 4 :: 22 : 16 : 40 : 27 females. Pronotal disk reduced laterally; carina visible on anterior third; pronotum and hemelytra finely rastrate, the latter with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow shorter than the pruinose area of the claval suture. Lateral lobe of prothorax elongate, rounded apically, sides parallel; mesoepimeron narrow with osteole near tip; metaxyphus broader than long, narrowly rounded at tip. Front leg of female of usual shape. Front leg of male: Pala rounded on dorsal margin, cultrate, with a small tubercle on dorsum near base, about 25 pegs in an almost straight row; tibia about half as long as pala with a short dorsal carina and no pad; femur slender, sides nearly parallel, with about 10 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with stout spines; segmental proportions as follows:

Middle leg: Femur : tibia : tarsus : claw :: 100 : 50.9 : 34.7 : 52.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 81.5 : 105.2 : 42.1. Male asymmetry dextral; strigil elongate, slender, of 4 regular combs. Median lobe of seventh abdominal segment not a broad triangular plate, narrow, tapering to narrow point; right margin of same segment without a triangular projection. For details of male structures see Plate CVIII, figs. 4, 4a, 4b and 4c.

Comparative notes: This species may be distinguished from all other S. A. *Tropocorixa* by having the pronotal disk reduced laterally. Though it is closely allied to *T. trimaculata* (Le Guillou) (= *fazi* Hungerford) and was first named as a variety of it, certain characters seem to validate it as a separate and distinct species. The middle tibia is shorter than the tarsal claw instead of being equal in length as in *trimaculata* (Le Guil.); the median lobe of the seventh abdominal segment is slender and tapers to a point; the right margin of the same segment has no triangular projection; and the tips of the ninth segment and the right claspers of the male genital capsule are different in shape and appearance.

Location of types: Holotype male, allotype female and 4 male and 18 female paratypes, labeled "Termas Cauquenes, Chile, S. A., Dec. 15, 1922, Alfredo Faz," in the Francis Huntington Snow Collections, University of Kansas. One pair sent to the British Museum.

Data on distribution: (Plate CXII.) Besides the above we have seen the following specimens:

CHILE: 1 male, 12 females bearing same data as the type series; Valparaiso, Jan. 27, 1939, C. J. Drake (Drake), 1 male.

Sigara (*Tropocorixa*) *jensen-haarupi* Jaczewski

(Plate CV, figs. 1, 1a-1c)

1927. *Sigara* (*S.*) *jensen-haarupi* Jaczewski, T. Ann. Zool. Mus. Pol. Hist. Nat. (Warsaw), T. VI, No. 3, pp. 253-256, Pl. VIII, figs. 9-16 (Argentina).

1928. *Arctocorixa jensen-haarupi*, Hungerford, H. B. Bull. Brooklyn Ent. Soc. XXIII, p. 174, Pl. VII, figs. 8 and 9.

1933. *Sigara* (*S.*) *jensen-haarupi*, Jaczewski, T. Ann. Mus. Zool. Pol., Tom. IX, Nr. 21, p. 333. (Argentina, Mendoza, at lights.)

1936. *Sigara* (*S.*) *jensen-haarupi*, Poisson, R. Ext. du Bull. de la Soc. Sci. de Bretagne, Tom. XIII, Fasc. 1 and 2, p. 6, footnote.

Size: Length 4.2 mm. to 4.7 mm. Width of head across eyes 1.6 mm. to 1.7 mm.

Color: General facies light to medium. Pronotum crossed by 7 brown bands, equal in width to pale interspaces. Figures on clavus and corium coarsely vermiculate, the distribution of light and dark pigmentation about equal, brown dominating in some specimens; corium and membrane separated by a pale line. Embolium, head, limbs and venter pale to smoky.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex slightly produced in male; interocular space less than the width of an eye; facial hairs few; male fovea broad but shallow. Pronotal disk with median carina visible on anterior third; rounded apically. Pronotum finely rastrate; hemelytra faintly rugulose, nonrastrate. Pruinose area of embolar groove posterior to nodal furrow equal in length to pruinose area of claval suture. Lateral lobe of prothorax half as broad at base as long, sides nearly parallel, apex rounded. Mesoepimeron narrow, osteole near the tip. Metaxyphus a little broader at base than long, broadly rounded apically. Front leg of male: pala cultrate, dorsal margin rounded; peg row almost straight, of about 22 teeth; tibia slender, about two-thirds as long as pala, short dorsal carina and no pad; femur slender, sides almost parallel, with about 7 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femora armed with several rows of stout spines; segmental proportions as follows (average):

Middle leg: Femur : tibia : tarsus : claw :: 100 : 42 : 26 : 36. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.3 : 107.1 : 35.7*. Male asymmetry dextral; without a strigil. Median lobe of seventh abdominal segment short and rounded apically; right margin of same segment triangularly produced. For details of male pala, abdomen, and genitalia see Plate CV, figs. 1, 1a, 1b and 1c

Comparative notes: This species may be distinguished in the males by the lack of a strigil, and in the females by having the middle femur armed with several rows of stout spines. In this latter character it resembles *trimaculata* (Le Guillou) but is much smaller in size.

Location of types: In the collection of Mr. A. C. Jensen-Haarup at Silkeborg, Denmark.

Data on distribution: (Plate CXII.) The University of Kansas has the following in its collections, gifts from the Helsingfors Museum: "Argentina, Jensen-Haarup," 2 males, 2 females. These must be of the paratype series. We also have 2 males on slides prepared by T. Jaczewski and given to me by Mr. Jensen-Haarup. These are labeled "Pedregal, Mendoza, 6-1-1907."

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* Jaczewski's figures are: Middle leg: 100 : 44.5 : 80 : 39.5; Hind leg: 100 : 92.5 : 102.6 : 50. This indicates variation.

Sigara (*Tropocorixa*) *roberti* n. sp.

(Plate CIX, figs. 2, 2a-2e)

Size: Length 4.5 mm. to 5 mm. Width across eyes 1.7 mm. to 1.8 mm.

Color: General facies dark. Pronotum crossed by 6 to 7 pale bands and by 7 to 8 brown bands of about equal width. Pattern of clavus and corium dark with obscure, pale, zigzig figures. Membrane and corium indistinctly separated; membranal pattern reticulate and obscure. Embolium smoky to black; head, limbs, and abdominal venter pale; venter of thorax and coxae smoky.

Structural characteristics: Head slightly more than half the length length of the pronotal disk; vertex not produced; postocular space narrow; interocular space slightly narrower than the width of an eye; male fovea poorly defined; face of both sexes sparsely haired; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 12 : 29 : 20 ♂; 1 : 2 : 3 : 4 :: 20 : 12 : 30 : 20 ♀. Pronotal disk about two-thirds as long as broad; lateral and distal margins rounded; disk and clavus moderately rastrate, corium rugulose to faintly rastrate; membrane shining; corium with numerous short, pale hairs. Postnodal pruinose area shorter than that of the claval suture. Lateral lobe of the prothorax elongate, sides slightly tapering, apex rounded, the anterior distal portion slightly produced. Mesoepimeron narrow with osteole near its tip. Metaxyphus slightly broader than long. Front leg of female of usual shape; pala with 18 to 20 lower palmar hairs. Front leg of male: pala with about 30 pegs as pictured on Plate CIX, fig. 2a; tibia about two-thirds as long as pala, with a dorsal carina and a small pad; femur relatively slender, without stridular area. Middle and hind legs relatively slender, the proportions of segments as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 45.8 : 31.7 : 45.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.9 : 113.2 : 43.3. Male asymmetry dextral; strigil oval, of 6 to 7 irregular combs. See Plate CIX, figs. 2—2e, for details of male structures. Female abdomen normal.

Comparative notes: Although this species closely resembles Doctor Jaczewski's *czakii* and *dita*, it may be distinguished from the former by having the metaxyphus broader than long and by having the interocular space narrower than an eye. From *dita* it may be distinguished by having no stridular area on the front femur of the male and by the shape of the male right clasper.

Location of types: Holotype male, allotype female, and 2 males and 2 females paratypes labeled "Ypirango, S. A., São Paulo, Brazil, R. Spitz" in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate CXII.) Besides the type series, we have the following record:

BRAZIL: Itanhaen, July, 1925, Roberto Spitz, 2 males, 1 female.

Sigara (*Tropocorixa*) *hungerfordi* Jaczewski

(Plate CV, figs. 2, 2a-2c)

1927. *Sigara* (*Sigara*) *hungerfordi* Jaczewski, T. Ann. Zool. Mus. Pol. Hist. Nat., T. VI, No. 1, pp. 40, 41, 54-59, text figs. 27-35, Pl. II, fig. 4 (Paraná, Brazil)

Size: Length 5.8 mm. to 6.25 mm. Width of head across eyes 1.8 mm. to 1.9 mm.

Color: General facies dark. Pronotum crossed by 7 broad, regular dark bands, at least twice as broad as pale interspaces. Clavus cross-banded at base with broad dark, fairly regular bands. Dark pattern vermiculate elsewhere on clavus and on corium. Pale markings narrow, wavy, and irregular. Corium and membrane separated by pale line. Embolium smoky to blackish. Head, limbs and venter pale.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex rounded out between eyes in both sexes as seen from above; facial hairs few in female, numerous and long around the impression in the male; interocular space less than the width of an eye; male fovea broad, its depth accentuated by the margin of long hairs; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 19 : 13 : 34 : 19 ♂ ; 1 : 2 : 3 : 4 :: 20 : 14 : 35 : 20 ♀ . Pronotal disk with median carina on anterior third; rounded apically; pronotum and hemelytra finely rastrate, the latter with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow shorter than the pruinose area of the claval suture. Mesoepimeron narrow, osteole near tip; metaxyphus usually broader than long, blunt at tip. Lateral lobe of prothorax narrow, rounded apically. Front leg of female of usual shape. Front leg of male: pala cultrate, dorsal margin rounded; 28 to 36 pegs in sinuously curved row, apical ones longer and more pointed, basal ones short and rounded; tibia about half as long as pala; short dorsal carina ending in a rounded pad; femur slender, without a patch of stridulatory pegs on inner surface but with a patch of slightly thickened hairs. Middle and hind legs slender; middle femora not armed with stout spines; average segmental proportions:

Middle leg: femur : tibia : tarsus : claw :: 100 : 42.6 : 31.2 : 39.4.* Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 85.8 : 102.9 : 37.2. Male asymmetry dextral; strigil large, oval, of 5 to 8 fairly regular combs. Right margin of seventh abdominal segment produced into triangular lobe. The left clasper of the male genital capsule unusually broad with an elongate point. For details of male pala, abdomen, and genital capsule, see Plate CV, figs. 2, 2a, 2b and 2c.

Comparative notes: The fringe of hairs on the dorso-lateral margin of the fovea of the male head separates this species from *S.* (*T.*) *braziliensis* n. sp.

Location of types: Described from Ponta Grossa, Río Claro—Serra da Esperança, Río do Areia—State of Paraná, Brazil. Types in the Polish Museum of Natural History, Warsaw. Three paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.) We have the following:

BRAZIL: Paraná, P. E. Z., I, 22, 1922, Jaczewski, Ponta Grossa, paratypes, 2 males, 1 female; Ypirango, São Paulo, R. Spitz, 8 males, 6 females; Itaquaquecetuba, July, 1933, W. O. Townsend, 1 male, 2 females; Campinas, Estado de São Paulo, 3/10/1924, F. X. Williams, 7 males, 5 females; Nova Teutonia, Fritz Plauman (Usinger), 1 male, 1 female.

Sigara (*Tropocorixa*) *braziliensis* n. sp.

(Plate CV, figs. 3, 3a-3c)

Size: Length 7.1 mm. Width of head across eyes 2.1 mm.

Color: General facies dark and obscure. Pronotum crossed by 8 dark bands, equal in width to pale interspaces. Clavus with dark pattern tending to coalesce on basal third, irregularly cross-banded apically. Corial pattern reticulate, space about evenly divided between light and dark coloration in wavy, short lines. Membrane separated from corium by a pale line. Embolium smoky. Head, limbs, and venter pale.

Structural characteristics: Head about four-fifths as long as pro-

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* Jaczewski gives: Middle leg: 100 : 47.5 : 35 : 46.1. Hind leg: 100 : 97.8 : 119.7 : 50.5.

notal disk; vertex of male roundly produced between eyes as seen from above; facial hairs few; male fovea broad but shallow; interocular space narrower than the width of an eye; antennal segmentation: 1 : 2 : 3 : 4 :: 22 : 17 : 40 : 25 male. Pronotal disk with median carina visible on anterior third; rounded apically. Pronotum and hemelytra finely rastrate, the latter with numerous short, pale hairs. Pruinose area of embolar groove posterior to nodal furrow slightly longer than the pruinose area of the claval fold. Lateral lobe of the prothorax twice as long as wide, sides tapering toward apex which is rounded. Metaxyphus about as broad as long, rounded apically. Front leg of male: Pala long, rounded on dorsal margin, cultrate; 36 pegs in an almost straight row; tibia about two-thirds as long as pala, dorsal carina extending almost to base, ending apically in a long, narrow pad lying along distal margin of tibia; femur slender, sides nearly parallel, without a patch of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with stout spines; middle tibia longer than tarsal claw; hind tibia longer than its femur; segmental proportions of middle and hind legs:

Middle leg: femur : tibia : tarsus : claw :: 100 : 51.5 : 38.6 : 44.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 102.9 : 137.3 : 42.9. Male asymmetry dextral, strigil moderately large, cone-shaped, of 11 to 12 irregular combs. Median lobe of seventh abdominal segment triangular in shape; right margin of same segment sinuous. For details of male structures see Plate CV, figs. 3, 3a, 3b and 3c.

Comparative notes: This species, although closely related to *S. hungerfordi* Jacz., may be distinguished from it in having the tibia of the hind leg longer than the femur and in the shape of the right margin of the seventh segment of the male abdomen.

Location of types: Holotype male, labeled "Brasil, Río," in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.) Known only by the type.

Sigara (*Tropocorixa*) *hosfordæ* (Hungerford) 1928

(Plate CX, figs. 1, 1a-1d)

1928. ***Arctocorixa hosfordi*** **Hungerford, H. B. Bull. Brooklyn Ent. Soc. XXIII, p. 176, Pl. VI, fig. 6. (Buenos Aires, Argentina.)**

1938. ***Sigara hosfordae,*** **Jaczewski, T. Ann. Mus. Zool. Pol., Tom IX, Nr. 21, p. 388. (Uruguay.)**

Size: Length 5.2 mm. to 6 mm. Width of head across eyes 1.8 mm. to 2 mm.

Color: General facies light to medium. Pronotum crossed by 8 regular dark bands, equal in width to pale interspaces. Clavus with irregularly transverse bands of light and dark. On corium dark pigment predominates over light. Dark figures short, thick, vermiculate; light ones short, irregular blotches in faintly longitudinal series. Embolium, head, limbs, and venter pale.

Structural characteristics: Head four-fifths as long as pronotal disk; vertex rounded out between eyes in both sexes as seen from above; interocular space less than the width of an eye; facial hairs few; male fovea broad and shallow, but well defined; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 20 : 14 : 36 : 21 ♂ ; 1 : 2 : 3 : 4 :: 20 : 13 : 30 : 21 ♀ . Pronotal disk with median carina visible on anterior third; rounded apically; pronotum finely rastrate, hemelytra faintly rugulose with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow shorter than the pruinose area of the claval suture. Lateral lobe of prothorax about half as wide at base as long, sides tapering, apex rounded; mesoepimeron narrow with osteole near tip; metaxyphus broader than long, apex rounded. Front leg of female of usual shape. Front leg of male: pala cultrate, short and thick, with a transverse carina on dorsal surface near base, 30 pegs in a curved row; tibia narrow, about half as long as pala, with a short dorsal carina and a pad; femur slender, sides nearly parallel, with 10 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with rows of stout spines; proportion of segment to segment as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 44.8 : 32.2 : 48.3. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 83.7 : 108 : 40.5. Male asymmetry dextral; strigil small, oval, of 5 regular combs. Right margin of seventh abdominal segment triangularly produced. For details of male pala, abdomen and genitalia see Plate CX, figs. 1, 1a to 1d.

Comparative notes: In external appearance this species is very close to *S.* (*T.*) *rubyae* (Hungerford) and to *S.* (*T.*) *schadei* (Hungerford). It may be separated from them by the structure of the male genitalia.

Location of types: This species was originally described from holotype male, allotype female, and 1 male and 1 female paratypes labeled "Buenos Aires, Mercedes, S. A., Nov. 19, 1923, R. Hosford." Unfortunately this was a mixed series, one male paratype proving to be a new species which we are naming. The type series is in the Francis Huntington Snow Collections, University of Kansas.

Data on distribution: (Plate CXII.) Known to us only by the type series from Argentina but Doctor Jaczewski reports it from Uruguay also.

Sigara (*Tropocorixa*) *santiagiensis* (Hungerford)

(Plate CVIII, figs. 3, 3a-3c)

1928. *Arctocorixa santiagiensis* Hungerford, H. B. Bull Brooklyn Ent. Soc. XXIII, pp 178-179, Pl. VI, fig. 1. (Chile.)

1935. *Sigara santiagiensis*, de Carlo, José A. Revista Chilena de Historia Natural, p. 109. (Systematized cat.)

Size: Length 5.8 mm. to 6.2 mm. Width of head across eyes 1.8 mm. to 2 mm.

Color: General facies darker than the normal. Pronotum crossed by 6 to 8 somewhat irregular brown bands, no wider than the pale interspaces. Dark pattern of hemelytra arranged in irregularly transverse series. Color about evenly distributed between light and dark. Embolium, head, and limbs pale; venter of thorax and bases of abdominal segments smoky.

Structural characteristics: Head about two-thirds as long as pronotal disk; cap-like; vertex smoothly rounded between eyes as seen from above; interocular space less than the width of an eye; facial hairs few; infraocular width of genae at level of the hypo-ocular suture less than the diameter of the middle femur; male fovea shallow, moderately broad, fairly well defined; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 17 : 35 : 30 ♂ ; 1 : 2: 3 : 4 :: 21 : 17 : 40 : 30 ♀ . Pronotal disk with median carina visible on anterior third; rounded apically; surface finely rastrate; hemelytra nonrastrate, shining. Pruinose area of embolar groove posterior to nodal furrow shorter than the pruinose area of the claval suture. Lateral lobe of prothorax about half as broad at base as long, sides nearly parallel, apex rounded; mesoepimeron narrow with osteole near tip; metaxyphus slightly broader than long, rounded apically. Front leg of female of usual shape. Front leg of male: pala cultrate, 33 to 37 pegs in slightly curving row, distal ones larger and longer than basal ones; tibia about half as long as pala, with short dorsal carina and a pad; femur slender, sides nearly parallel, with rounded patch of about [illegible] rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur without several rows of stout spines; segmental proportions as follows:

Middle leg: femur : tibia : tarsus : claw :: 100 : 49.8 : 33.2 : 49.8.

Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 93.8 : 102.5 : 36.9. Male asymmetry dextral, strigil of 6 irregular combs; median lobe of seventh abdominal segment quadrate, without hairs; right margin of same segment angulate. Right clasper of male genital clasper broad throughout its length. For details of male pala, abdomen, and genitalia see Plate CVIII, figs. 3, 3a, 3b and 3c.

Comparative notes: This species is closely allied to *T. argentiniensis* n. sp. and to *T. czakii* Jacz., but differs from both in having the median lobe of the seventh abdominal segment of the male quadrate in shape, whereas the other two have this lobe triangular in shape.

Location of types: Holotype male, allotype female and 2 males paratypes labeled "Santiago, Chile, S. A., Alfredo Faz" in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.) Besides the types we have the following records:

ARGENTINA: Bariloche Río Negro, R. B. Vereertbrugghen, 4 males, 3 females.

Sigara (Tropocorixa) dita Jaczewski

(Plate CVIII, figs 1, 1a-1c)

1927. *Sigara (Sigara) dita* Jaczewski, T. Ann Zool Mus Pol Hist Nat, VI, No 1, p. 46, figs 10-18, Pl II, fig. 2 (Paraná, Argentina)

1928. *Arctocorixa dita,* Hungerford, H B Bull. Brooklyn Ent Soc, XXIII, p 179, Pl. VII, figs 1 and 2

1980. *Sigara dita*, Jaczewski, T Mitteil aus dem Zool Staatsinstitut und Zool Mus. in Hamb, XLIV, p 147 (Paraná, Brazil)

Size: Length 4.2 mm. to 5.4 mm. Width of head across eyes 1.5 mm. to 1.8 mm.

Color: General facies medium to dark. Pronotum crossed by 7 to 9 fairly regular dark bands usually wider than pale interspaces. Base of clavus with broken, transverse bands. Pattern elsewhere irregular, broken into about equal distribution of light and dark areas. Membrane and corium separated by pale line. Embolium smoky. Head, limbs, and venter pale.

Structural characteristics: Head about two-thirds as long as pronotal disk; smoothly rounded across vertex as seen from above; facial hairs few; infraocular width of genae at level of the hypoocular suture less than the diameter of the middle femur; male fovea distinct, shallow, not attaining eyes laterally; interocular space less than the width of an eye; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 21 : 12 : 29 : 21 ♂; 1 : 2 : 3 : 4 :: 20 : 12 : 30 : 22 ♀.

Pronotal disk with median carina plain on anterior third and visible on most of the length of the disk; finely rastrate; rounded apically. Hemelytra faintly rastrate to rugulose, covered with fine pale hairs; membrane shining. Pruinose area of embolar groove posterior to nodal furrow shorter than the pruinose area of the claval suture. Lateral lobe of prothorax elongate, rounded apically; mesoepimeron narrow with osteole near the tip; metaxyphus broader than long, rounded apically. Front leg of female of usual shape. Front leg of male: pala cultrate, 24 to 30 pegs in an undulate curved row,[*] those at base shorter and more rounded than distal ones; tibia about two-thirds as long as pala, slender with short dorsal carina and a small pad; femur slender with sides nearly parallel, 9 rows of small stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with stout spines; segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 45.6 : 36.9 : 47.4. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.9 : 116.6 : 42.3.[†] Male asymmetry dextral; strigil small, suboval, 3 or 4 regular combs, located at end of short pedicel. Right margin of seventh abdominal segment not triangularly produced. For details of male pala, abdomen, and genitalia see Plate CVIII, figs. 1, 1a, 1b and 1c.

Comparative notes: This appears to be our smallest South American species with a strigil.

Location of types: Polish Museum of Natural History, Warsaw, and four paratypes, "Río do Areia, III, 25, 1922, Paraná, Brazil, P. E. Z., T. Jaczewski" in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.)

BRAZIL: Campinas Estado do São Paulo, March 10, 1924, F. X. Williams, 2 males; Nova Teutonia, Fritz Plauman (Usinger); Resistencia, Chaco, to Santiago del Estero, April 4-9, 1940, D. M. Cochran (U. S. N. M. Coll.), 1 female.

ARGENTINA: Pico, Sept. 9, 1940 (U. S. N. M. Coll.), 1 female.

Sigara (Tropocorixa) egbertæ n. sp.

(Plate CVII, figs. 2, 2a-2c)

Size: Length 5.9 mm. Width of head across the eyes 1.9 mm.

Color: General facies medium brown. Pronotum crossed by 5 or 6 brown bands that are a little broader than pale interspaces.

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[*] Not shown in my drawing on Plate CVIII, fig. 1.

[†] Jaczewski gives: Middle leg: 100 : 49.6 : 35.9 : 45.4; Hind leg: 100 : 95.2 : 108.4 :

Clavus crossed by dark bands, a little wider than interspaces, some of them furcate. Corial markings more broken and irregular but transverse. The figures coarser than in *S.* (*T.*) *czakii* Jaczewski. Corium and membrane faintly separated by a pale line but of same pattern. Embolium pale. Venter with basal abdominal segments dark.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex rounded out beyond the margins of eyes as seen from above. Interocular space a little less than the width of an eye. Infraocular width of genae at level of the hypo-ocular suture less than the diameter of the middle femur; facial hairs few; male fovea broad, shallow, poorly defined. Pronotal disk with median carina visible on anterior third; lateral margins rounded; apex angulate. Pronotum and hemelytra moderately rastrate. Pruinose area of embolar groove posterior to nodal furrow shorter than pruinose area of claval suture. Lateral lobe of prothorax elongate, sides nearly parallel, rounded apically. Mesoepimeron narrow with osteole near the tip. Metaxyphus broader than long, bluntly rounded apically. Front leg of male: pala cultrate, long and narrow, 32 pegs in almost a straight row; tibia about half as long as pala, large and rounded; short dorsal carina, terminating apically in a pad; femur slender, sides almost parallel, with about ten rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with stout spines; segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 48.2 : 33.9 : 48.2. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 100 : ? : ?. Male asymmetry dextral; strigil elongate, oval, of 4 regular combs. Median lobe of seventh abdominal segment large and rather long; right margin of same segment as shown in figure 2c on Plate CVII. For details of male pala, abdomen and genitalia see Plate CVII, figs. 2, 2a, 2b and 2c.

Comparative notes: This species is close to *S.* (*T.*) *termasensis* (Hungerford) from which it may be separated by several characters better than by the right clasper of the male which is very similar in these species. The pronotal disk is not laterally reduced as it is in *S.* (*T.*) *termasensis.*

Location of type: Described from a single male labeled "Bariloche, Río Nigro, Terr. Arg., R. B. Vereertbrugghen." This is in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.) Known only by the type.

Sigara (*Tropocorixa*) *chrostowskii* Jaczewski

(Plate CVI, figs. 2, 2a-2c)

1927 *Sigara* (*Sigara*) *chrostowskii* Jaczewski, T. Ann. Zool. Mus. Pol. Hist Nat., T. VI, No 1, pp. 40, 41, 42-46, figs. 1-9; Pl. II, fig. 1 (Paraná, Argentina).

1928 *Arctocorixa chrostowskii*, Hungerford, H B Bull Brooklyn Ent Soc. XXIII, p 179, Pl. VI, fig 7.

1928 *Sigara* (*Sigara*) *chrostowskii*, Jaczewski, T. Ann Mus Nat Hung., Vol. XXV, p. 214.

1929. *Sigara* (*S*) *chrostowskii*, Lundblad, O. Zoologischer Anzeiger, Bd 80, Heft 7/9, pp. 197-200, figs 6-11

1980 *Sigara chrostowskii*, Jaczewski, T Mitteil aus dem Zool Staatsinst und Zool Mus. Hamb, Bd 44, p 147 (Brazil)

1983. *Sigara* (*Sigara*) *chrostowskii*, Jaczewski, T. Ann Mus Zool Pol, Vol. IX, 21, p 838 (Brazil)

Size: Length 5.25 mm. to 6.3 mm. Width of head across eyes 1.8 mm. to 2 mm.

Color: General facies medium to dark. Pronotum crossed by 7 to 8 broad, regular brown bands. Hemelytral pattern reticulate in somewhat longitudinal series. Membrane and corium separated by a pale line. Embolium smoky. Head, limbs and venter pale.

Structural characteristics: Head about two-thirds as long as pronotal disk;* vertex slightly produced in both sexes; interocular space slightly narrower than the width of an eye; infraocular width of genae at level of the hypo-ocular suture less than the diameter of the middle femur; facial hairs few; male fovea shallow, not attaining eyes laterally; antennal segmentation: 1 : 2 : 3 : 4 :: 20 : 18 : 30 : 25 ♂ ; 1 : 2 : 3 : 4 :: 20 : 16 : 33 : 28 ♀ . Pronotal disk about two-thirds as long as wide, faint indication of median carina visible on anterior third; pronotum faintly rastrate, hemelytra smooth, shining, with a few pale hairs. Postnodal pruinose area shorter than that of the claval suture. Pleural region slightly inflated. Lateral lobe of prothorax narrow, about half as broad at base as long, rounded apically; mesoepimeron narrow with osteole near its tip; metaxyphus broader than long, rounded apically. Front leg of female of usual shape. Front leg of male: pala cultrate, the sides almost parallel, about 26 pegs (24-31) in a single, almost straight row, small at base, larger and longer apically; tibia about half as long as pala, dorsal carina extending almost to base, with a pad; femur slender, with 8 to 12 rows of stridulatory pegs on inner surface, surrounded by fine hairs. Middle and hind legs slender; segmentation: Middle leg: femur : tibia : tarsus : claw :: 100 : 51.5 : 37.2 : 48.6. Hind leg: femur : tibia : tarsus 1 : tar-

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* Jaczewski says male head about five-sixths, female head four-sevenths of pronotal disk but in specimens he sent us the head is not so long.

sus 2 :: 100 : 92.8 : 123.8 : 42.4.† Male asymmetry dextral; strigil small, round, of 5 fairly regular combs. Right margin of seventh abdominal segment triangularly produced. Right clasper of genital capsule with 3 to 7 toothlike serrations on a lobe before the tip. For details of male abdomen, pala and genitalia see Plate CVI, figs. 2, 2a, 2b and 2c.

Comparative notes: Males of this species may be distinguished by having the right clasper with a serrated lobe before the tip. In this character it also resembles *S.* (*T.*) *townsendi* Hungfd. from which it may be distinguished by its larger size.

Location of types: Polish Museum of Natural History, Warsaw, and paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.)

BRAZIL: São Paulo, Oct., 1935, via A. M. Olalla, 6 males, 2 females; same place, May, 1927, E. D. Townsend, 11 males, 32 females; same place and collector, Aug. 7, 1927, 11 males, 30 females; same place, Roberto Spitz, 6 males, 10 females; Itanhaém, same collector, July, 1925, 5 males, 10 females; Estado de São Paulo, 4 males, 25 females; São Domingo, Paraná, P. E. Z., Feb. 18, 1922 (det. Jaczewski), 2 males, 3 females (on one pin); nr. Porto Alegre, temp. pools on grassland, Aug., 1941, H. Kleerekoper, 13 males, 55 females; Itaquaquecetuba, July, 1933, W. O. Townsend, 2 males, 5 females; same place, via Poa EFCB est de São Paulo, E. D. Townsend, 48 males, 184 females; same place and collector, 1931, 240 males, 266 females; Nova Teutonia, Fritz Plauman (Usinger); Japurá (River) Catandura, W. F. A., via Oscar Monte, 1 male, 1 female.

PARAGUAY: Villa Rica, Estero Grande, Francisco Schade, 2 males, 3 females; same place and collector, Oct. 30, 1924, 4 males, 12 females; Caraveni, Oct. 30, 1924, same collector, 3 males, 10 females; Hapé, Nov. 20, 1924, same collector, 4 males, 2 females; Villa Rica, Dec. 16, 1924, same collector, 2 males, 2 females.

ARGENTINA: Paranacito, Prov. de Entre Ríos, 10 males, 8 females; Buenos Aires, Nov. 23, 1938, C. J. Drake, 1 male, 2 females.

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† Jaczewski gives: Middle leg: 100 : 46.2 : 38.2 : 44.4; Hind leg: 100 : 94.1 : 109.8 : 49.8.

Sigara (Tropocorixa) brachypala (Hungerford)

(Plate CVI, figs. 1, 1a-1c)

1928 *Arctocorixa chrostowskii* var *brachypala* Hungerford, H B. Bull. Brooklyn Ent. Soc., Vol XXIII, p. 177, Pl. VII, figs. 3 and 6 (São Paulo, Brazil.)

Size: Length 5.5 mm. Width of head across eyes 1.8 mm.

Color: General facies medium; lighter than *S.* (*T.*) *chrostowskii* Jacz. Pronotum crossed by 7 regular brown bands, slightly broader than pale interspaces. Hemelytral pattern reticulate in somewhat longitudinal series; slight tendency for brown areas to coalesce along inner apical angle of corium. Embolium smoky. Corium and membrane separated by a pale line. Head, limbs and venter pale.

Structural characteristics: Head two-thirds as long as pronotal disk; vertex not produced as seen from above; interocular space slightly less than the width of an eye. Infraocular width of the genae at the level of the hypo-ocular suture less than the diameter of the middle femur; facial hairs few; male fovea shallow; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 18 : 16 : 30 : 28 ♂. Pronotal disk a little more than half as long as broad, median carina hardly visible on anterior fourth; pronotum rugulose; hemelytra smooth, shining, with a few pale hairs. Postnodal pruinose area shorter than that of the claval suture. Lateral lobe of prothorax half as broad at base as long, tip obliquely truncate; mesoepimeron narrow with osteole near tip; metaxyphus broader than long, tip rounded. Pleural region slightly inflated. Front leg of male: pala cultrate with a small tubercle or carina at base on dorsal surface, pala short and broad, strongly curved in at tip, about 28 pegs in a slightly curved row; tibia about two-thirds as long as pala, short dorsal carina, and a small pad; femur slender with about ten rows of stridulatory pegs on inner surface, margins nearly parallel. Middle and hind legs slender; middle femur not armed with stout spines; segmental proportions as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 43.8 : 31.5 : 43.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 60.1 : 108.7 : 27.2. Male asymmetry dextral, strigil oval, of 5 rows of regular combs, located at end of a triangular projection of sixth abdominal segment. Right margin of seventh abdominal segment with a small, sharp triangular projection. Right clasper of genital capsule serrate along dorsal surface near tip. For details of male pala, abdomen, and genitalia see Plate CVI, figs. 1, 1a, 1b, and 1c.

Comparative notes: This species is closely allied to *S.* (*T.*) *chrostowskii* Jacz, from which it may be distinguished by the short, broad pala of the male, by having the strigil at the end of a triangular plate.

Location of types: Holotype male labeled "São Paulo, Brazil, May, 1927, E. D. Townsend," in the Francis Huntington Snow Entomological Collections, University of Kansas. Although I described this as a variety of *S. chrostowskii* Jacz., it comes from the same place and must be recognized as a sibling species or else only within the range of variation of *S.* (*T.*) *chrostowskii*. The type is slightly teneral.

Data on distribution: (Plate CXII.) Known only by the type.

Sigara (*Tropocorixa*) *townsendi* (Hungerford)

(Plate CVI, figs. 8, 8a-8c)

1928 *Arctocorixa chrostowskii* var. *townsendi* Hungerford, H. B. Bull. Brooklyn Ent. Soc., Vol. XXIII, p. 177, Pl. VII, figs. 4-5 (São Paulo, Brazil).

Size: Length 5.1 mm. to 5.9 mm. Width of head across eyes 1.7 mm. to 2 mm.

Color: General facies medium to dark, a little darker than *S.* (*T.*) *chrostowskii* (Jacz.). Pronotum crossed by 6 or 7 regular, dark bands, a little broader than pale interspaces. Hemelytral pattern with pale figures broken, furcate or vermiculate. Membrane and corium separated by a pale line. Head, limbs, venter and embolium pale.

Structural characteristics: Head about three-fourths as long as the pronotal disk, the vertex rounded out beyond eyes as seen from above; interocular space less than the width of an eye; infraocular width of genae at level of the hypo-ocular suture less than the diameter of the middle femur; facial hairs few; male fovea shallow, broad, not quite attaining eyes laterally; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 16 : 14 : 33 : 32 ♂. Pronotal disk about two-thirds as long as wide, pointed apically, median carina faintly visible on anterior fourth. Pronotum finely rastrate, hemelytra smooth, shining, with a few pale hairs. Pruinose area of the embolar groove posterior to the nodal furrow shorter than that of the claval suture. Lateral lobe of prothorax slender, half as wide at base as long, anterior distal angle produced. Mesoepimeron slender, osteole near tip. Metaxyphus broader than long, bluntly rounded apically. Front leg of female of usual shape. Front leg of male: pala cultrate, 25 pegs in slightly curved row, with a small carina on dorsal margin near junction with tibia, upper palmar row of bristles crowded basally, further apart and larger distally; tibia about two-thirds as long as pala, with short dorsal carina, and no pad; femur slender with 10-12 rows of stridulatory pegs on its inner surface. Middle and hind legs slender; relation of segment to segment as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 43.2 : 29.9 : 39.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 89.9 : 119.9 : 46.6. Male asymmetry dextral, strigil small, suboval in shape, of 5 regular combs. Right margin of seventh abdominal segment with markedly produced triangular lobe. Right clasper similar to that of *T. chrostowskii* (Jacz.), but with more serrations near the tip. For details of male structures see Plate CVI, figs 3, 3a, 3b and 3c.

Comparative notes: This species is very closely allied to *chrostowskii* Jacz but is a little darker in color, has more processes on the right clasper, and the lobe of the right margin of the seventh abdominal segment of the male is more pronounced. Originally described as a variety of *S chrostowskii* Jacz. but really is a sibling species

Location of types: Holotype male, labeled "São Paulo, Brazil, S. A , May, 1927, E. D. Townsend," in the Francis Huntington Snow Entomological Collections, University of Kansas

Data on distribution: (Plate CXII) Known only by the type.

Sigara (*Tropocorixa*) *denseconscriptoidea* (Hungerford)

(Plate CX, figs 5 5a-5c)

1928 *Arctocorixa denseconscriptoidea* Hungerford, H B Bull Brooklyn Ent Soc , XXIII, p 176-177, Pl VI, fig 10 (Sao Paulo, Brazil)

1929 *Sigara bahiensis* Lundblad, O Ent Meddelelser, XVI, pp 291-294, Pl III, figs 14-18

1930 *Sigara denseconscriptoidea*, Jaczewski, T Mitteil aus dem Zool Staatsinst und Zool Mus , Hamburg XLIV, p 147 (Brazil) (Says *S bahiensis* Lundblad is syn)

1933 *Sigara denseconscriptoidea*, Jaczewski, T Ann. Mus. Zool Pol , Tom IX, Nr 21, p 833 (Brazil)

Size: Length 5.7 mm., to 6.1 mm. Width of head across eyes 1.8 mm. to 1.9 mm.

Color: General facies medium, color pattern distinct Pronotum crossed by 7 regular brown bands, no wider than pale interspaces. Base of clavus with broken more or less transverse bands. Pattern elsewhere wavy and broken, in faintly longitudinal series. Embolium, head, limbs, and venter pale.

Structural characteristics: Head about two-thirds as long as pronotal disk; males with vertex conically produced as seen from above; interocular space less than the width of an eye; facial hairs few; male fovea deep, narrow, and well defined; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 23 : 14 : 36 : 23 ♂ ; 1 : 2 : 3 : 4 :: 23 : 14 : 34 : 23 ♀. Pronotal disk rounded behind, about half as long as broad, finely rastrate, and with median longitudinal carina visible on anterior third; hemelytra nonrastrate, shining, with a few pale hairs. Pruinose area of embolar groove posterior to nodal furrow shorter than the pruinose area of the claval suture Lateral lobe of prothorax about half as broad as long, rounded apically; mesoepimeron narrow with osteole near tip; metaxyphus about as long as broad, rounded apically. Front leg of female of usual shape. Front leg of male: pala cultrate, longitudinally carinate on outside, 23 pegs arranged in a curved row; tibia about half as long as pala, rather broad, with a short dorsal carina terminating distally in a round pad; femur slender, with about 10 rows of stridulatory pegs on inner surface. Middle and hind legs slender; middle femur not armed with stout spines; proportion of segments as follows: Middle leg: femur : tibia : tarsus : claw :: 100 : 48.1 : 33.6 : 51.8. Hind leg: femur : tibia : tarsus 1 : tarsus 2 :: 100 : 77 8 : 105.8 : 42.9. Male asymmetry dextral; strigil small, of about 4 to 5 rows of regular combs, located at tip of a short pedicel. Right margin of seventh abdominal segment with a triangular projection. For details of male pala, abdomen, and genital capsule see Plate CX, figs. 5, 5a, 5b and 5c.

Comparative notes: This species may be distinguished from others of the group by having the head of the male more conically produced and by having the middle tibia shorter than its tarsal claw.

Location of types: Described from 21 specimens taken at São Paulo and Itanhaém, Brazil, by Roberto Spitz. Holotype male (São Paulo), allotype female (Itanhaém), 5 male and 14 female paratypes. Holotype, allotype and some paratypes in the Francis Huntington Snow Collection, University of Kansas; others in the British Museum and the Polish Museum. Types of *S. bahiensis* Lundblad in the Copenhagen Museum.

Data on distribution: (Plate CXII.)

BRAZIL: Espíritu Santo, Coll. Breddin, 1 male.

ARGENTINA: Resistencia, Chaco, to Santiago del Estero, April 4-9, 1940, H. L. Parker (U. S. N. M.), 2 females.

Sigara (Tropocorixa) argentiniensis n. sp.

(Plate CVIII, figs. 2, 2a-2d)

Size: Length 5.5 mm. Width of head across eyes 1.8 mm.

Color: General facies medium. Pronotum crossed by 6 or 7 dark, regular bands, about as broad as pale spaces. Clavus cross-banded at base. Pattern elsewhere with dark color dominant over light, and arranged in irregularly transverse series. Embolium, head, limbs, and venter pale.

Structural characteristics: Head about two-thirds as long as pronotal disk; vertex rounded as seen from above; interocular space less than the width of an eye; male fovea broad, shallow, not attaining eyes laterally, and with a short median carina at upper margin; facial hairs scanty; antennal segmentation as follows: 1 : 2 : 3 : 4 :: 19 : 14 : 30 : 19 ♂. Pronotal disk with a faint median carina visible on anterior third; rounded apically; pronotum and hemelytra nonrastrate, faintly rugulose. Pruinose area of embolar groove posterior to nodal furrow shorter than the pruinose area of the claval suture. Lateral lobe of the prothorax about half as broad at base as long, sides nearly parallel, apex rounded; mesoepimeron narrow with osteole near tip; metaxyphus broader than long, pointed apically. Front leg of male: pala cultrate with transverse carina near base on dorsal margin, 26 pegs in a curved row; tibia about half as long as pala, with a sharp dorsal carina extending from base to apex, terminating in a round pad with a cuplike depression; femur slender, sides nearly parallel, with 9 to 10 rows of stridulatory pegs on inner surface. Middle leg slender; middle femur not armed with stout spines; hind leg missing; segmental proportions of middle leg: femur : tibia : tarsus : claw :: 100 : 43 : 31.9 : 39.6. Male asymmetry dextral; strigil of moderate size, oval, of about 10 regular combs. Median lobe of seventh abdominal segment rounded; right margin of same segment smoothly curved, without triangular projection. For details of male pala, abdomen and genitalia see Plate CVIII, figs. 2, 2a, 2b, 2c, and 2d.

Comparative notes: Structurally this species seems closest to *T. dita* Jacz. and *T. santiagiensis* (Hungfd.). It differs from the former in being larger and in having the tibia of the middle leg longer than the tarsal claw whereas in *dita* Jacz. it is shorter. It differs from *santiagiensis* (Hungfd.) in having the right margin of the seventh abdominal segment of the male smoothly rounded, whereas the other species has a triangular projection.

Location of type: Described from one male specimen formerly labeled *A. hosfordæ* (Hungerford), taken "Buenos Aires, Mercedes, Nov. 19, 1923, Ruby Hosford." In the Francis Huntington Snow Entomological Collections, University of Kansas.

Data on distribution: (Plate CXII.) Known to us only by the type.

PLATE CV

Sigara Tropocorixa Hutchinson

FIG. 1. *Sigara (Tropocorixa) jensen-haarupi* Jaczewski; dorsal view of male abdomen.

FIG. 1a. Head of male.

FIG. 1b. Pala of male (after Jaczewski).

FIG. 1c Genital capsule of male.

FIG. 2. *Sigara (Tropocorixa) hungerfordi* Jaczewski; dorsal view of male abdomen.

FIG. 2a. Pala of male.

FIG. 2b. Head of male.

FIG 2c. Genital capsule of male.

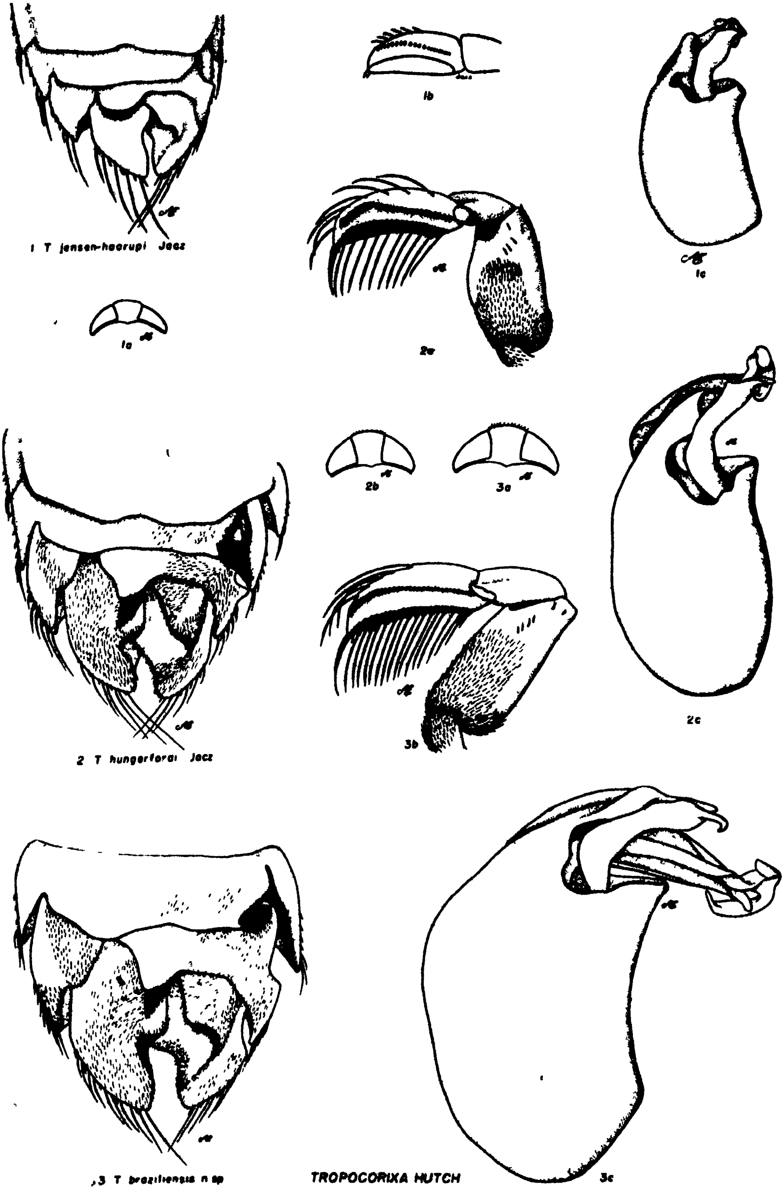
FIG. 3 *Sigara (Tropocorixa) braziliensis* n. sp.; dorsal view of male abdomen.

FIG. 3a. Head of male.

FIG. 3b. Pala of male.

FIG. 3c. Genital capsule of male

PLATE CV



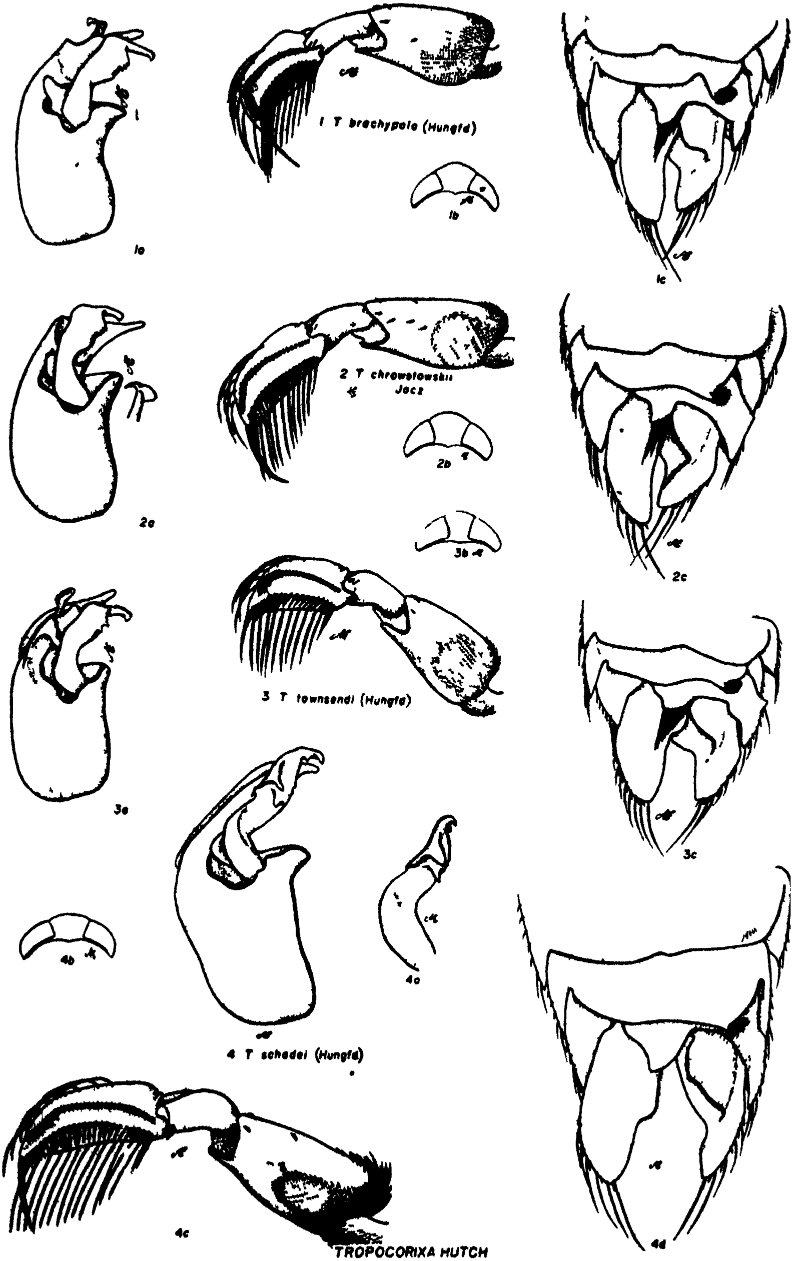
TROPOCORIXA HUTCH

PLATE CVI

Sigara Tropocorixa Hutchinson

FIG. 1. *Sigara* (*Tropocorixa*) *brachypala* (Hungerford); pala of male.
FIG. 1a. Genital capsule of male.
FIG. 1b. Head of male.
FIG. 1c. Dorsal view of male abdomen.
FIG. 2. *Sigara* (*Tropocorixa*) *chrostowskii* Jaczewski; pala of male.
FIG. 2a. Genital capsule of male.
FIG. 2b. Head of male.
FIG. 2c. Dorsal view of male abdomen.
FIG. 3. *Sigara* (*Tropocorixa*) *townsendi* (Hungerford); pala of male.
FIG. 3a. Genital capsule of male.
FIG. 3b. Head of male.
FIG. 3c. Dorsal view of male abdomen.
FIG. 4. *Sigara* (*Tropocorixa*) *schadei* (Hungerford); genital capsule of male.
FIG. 4a. Right clasper, showing variation.
FIG. 4b. Head of male.
FIG. 4c. Pala of male.
FIG. 4d. Dorsal view of male abdomen.

PLATE CVI



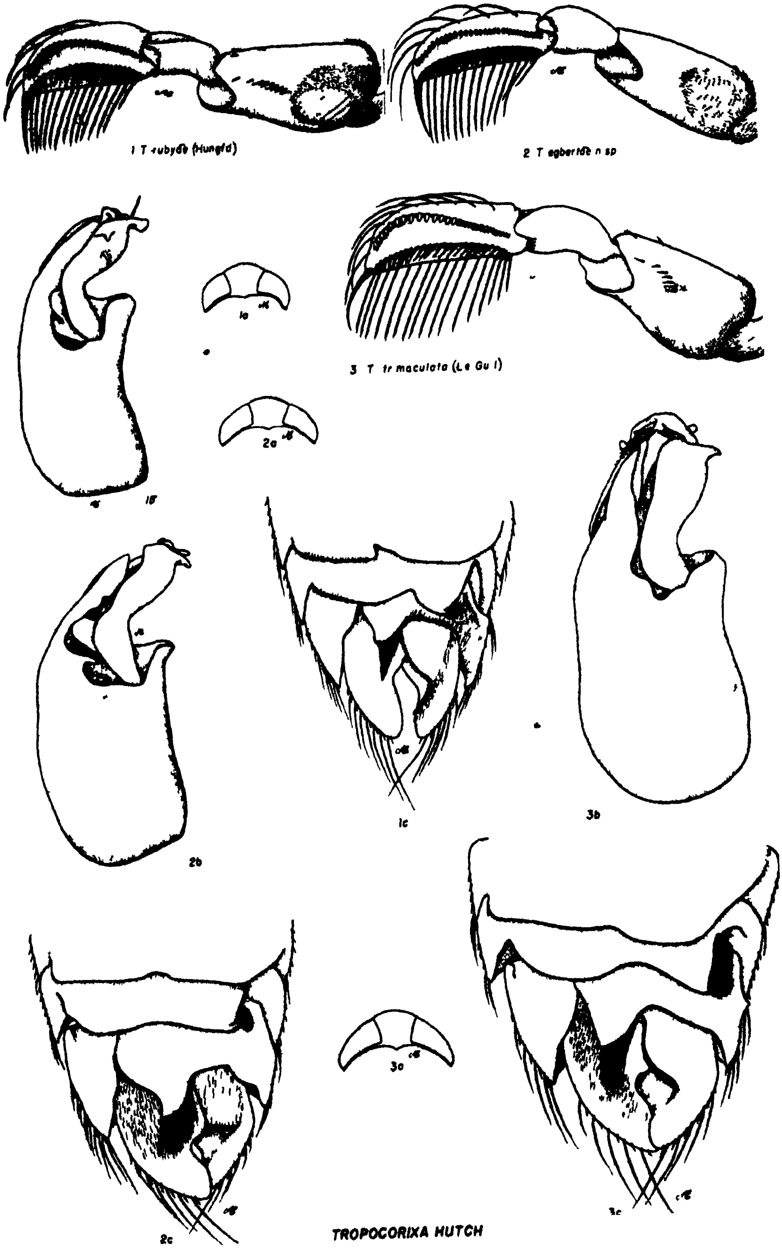
TROPOCORIXA HUTCH

PLATE CVII

Sigara Tropocorixa Hutchinson

Fig 1 *Sigara (Tropocorixa) rubyæ* (Hungerford), pala of male
Fig 1a Head of male
Fig 1b Genital capsule of male
Fig 1c Dorsal view of male abdomen
Fig 2 *Sigara (Tropocorixa) egbertæ* n sp , pala of male
Fig 2a Head of male
Fig 2b Genital capsule of male
Fig 2c Dorsal view of male abdomen
Fig 3 *Sigara (Tropocorixa) trimaculata* (Le Guillou) [= *fazi* (Hungerford)], pala of male
Fig 3a Head of male
Fig 3b Genital capsule of male
Fig 3c Dorsal view of male abdomen

PLATE CVII



TROPOCORIXA HUTCH

PLATE CVIII

Sigara Tropocorixa Hutchinson

FIG. 1. *Sigara* (*Tropocorixa*) *dita* Jaczewski; pala of male. Pegs should have been shown in an undulate curved row.

FIG. 1a. Head of male.

FIG. 1b. Genital capsule of male.

FIG. 1c. Dorsal view of male abdomen.

FIG. 2. *Sigara* (*Tropocorixa*) *argentiniensis* n. sp.; pala of male.

FIG. 2a Head of male.

FIG. 2b. Genital capsule of male

FIG. 2c. Dorsal view of male abdomen.

FIG. 2d. Dorsal view of male pala.

FIG. 3. *Sigara* (*Tropocorixa*) *santiagiensis* (Hungerford); pala of male.

FIG. 3a, Head of male

FIG. 3b. Genital capsule of male

FIG. 3c. Dorsal view of male abdomen

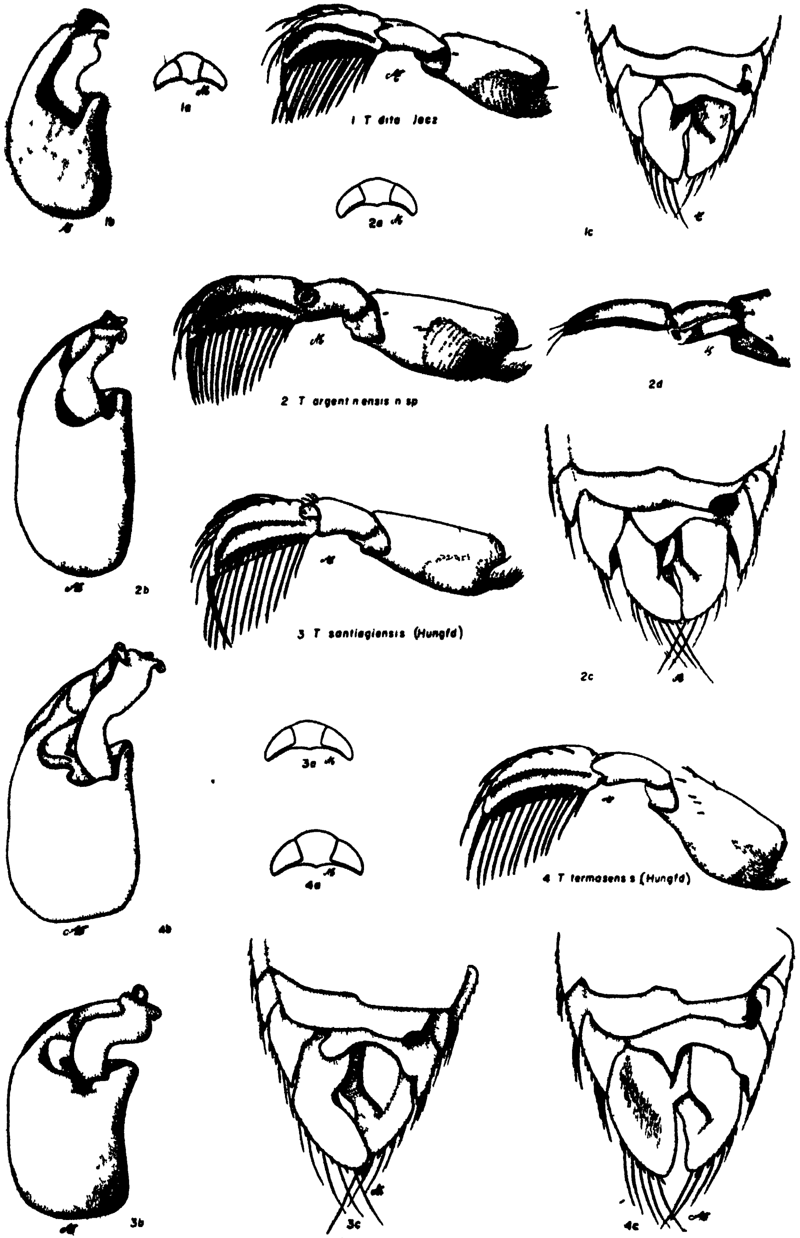
FIG. 4. *Sigara* (*Tropocorixa*) *termasensis* (Hungerford); pala of male

FIG. 4a. Head of male.

FIG 4b. Genital capsule of male

FIG 4c. Dorsal view of male abdomen

PLATE CVIII



TROPOCORIXA HUTCH

PLATE CIX

Sigara Tropocorixa Hutchinson

FIG. 1 *Sigara* (*Tropocorixa*) *czakii* Jaczewski; dorsal view of male abdomen.

FIG. 1a Pala of male.

FIG 1b. Head of male.

FIG. 1c. Right clasper of male.*

FIG. 1d. Right clasper of male.

FIG. 1e. Right clasper of male.*

FIG. 1f. Metaxyphus.

FIG. 1g. Left clasper of male.*

FIG. 2. *Sigara* (*Tropocorixa*) *roberti* n. sp.; dorsal view of male abdomen.

FIG. 2a. Pala of male.

FIG 2b. Head of male.

FIG. 2c. Right clasper of male, left view.

FIG 2d. Right clasper of male, right view.

FIG. 2e. Metaxyphus.

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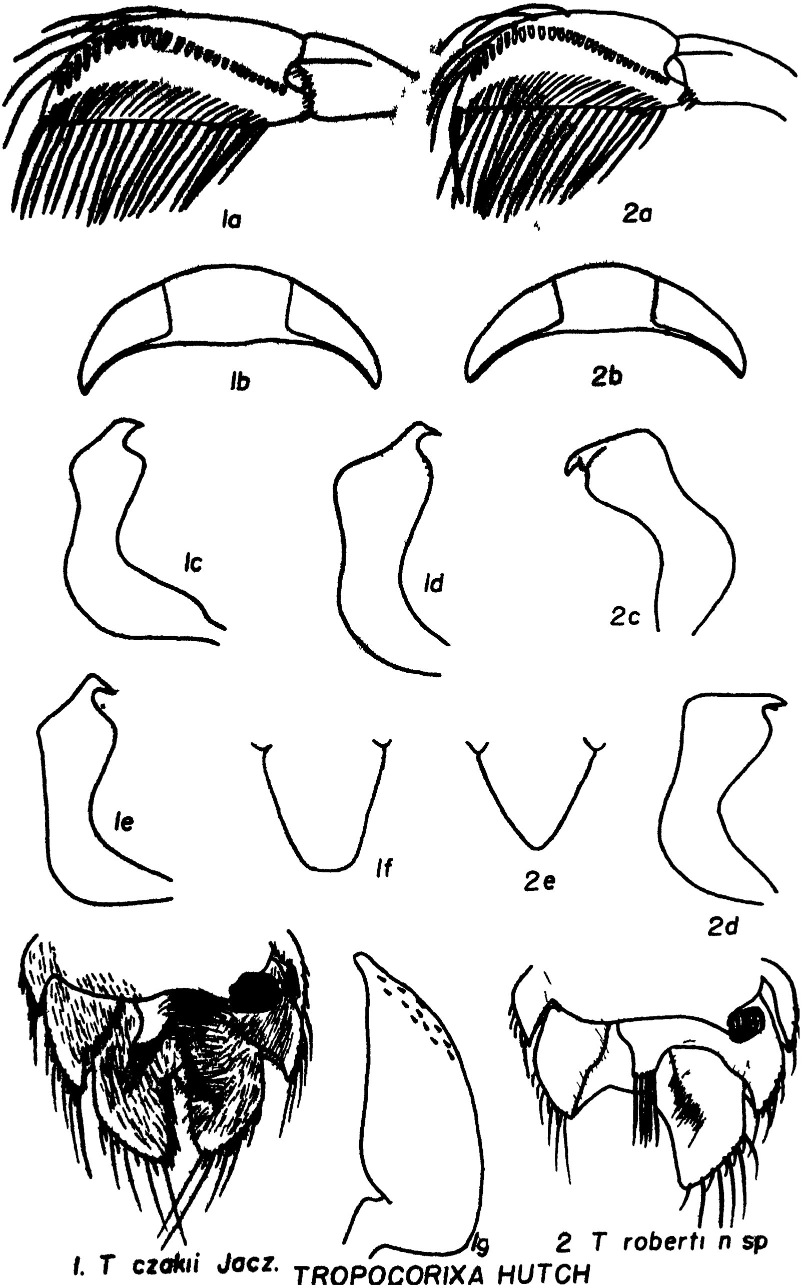
* Drawings after Jaczewski.

PLATE CIX



1. T czakii Jacz. 2 T roberti n sp

TROPOCORIXA HUTCH

PLATE CX

[illegible] *Tropocorixa* Hutchinson

FIG. 1. *Sigara* (*Tropocorixa*) *hosfordæ* (Hungerford); dorsal view of male abdomen.

FIG. 1a. Dorsal view of male pala.

FIG. 1b. Head of male.

FIG. 1c. Pala of male.

FIG. 1d. Genital capsule of male.

FIG. 2. *Sigara* (*Tropocorixa*) *forciceps* (Spinola); dorsal view of male abdomen.

FIG. 2a. Pala of male.

FIG. 2b. Head of male.

FIG. 2c. Tip of penial sheath of male genital capsule.

FIG. 2d. Right clasper of male, showing variation.

FIG. 2e. Genital capsule of male.

FIG. 3. *Sigara* (*Tropocorixa*) *rehi* Jaczewski; pala of male.*

FIG. 3a. Right clasper of male.*

FIG. 3b. Sixth segment of male abdomen, showing strigil.*

FIG. 4. *Sigara* (*Tropocorixa*) *denseconscripta* (Breddin); dorsal view of male abdomen.

FIG. 4a. Pala of male.

FIG. 4b. Head of male.

FIG. 4c. Genital capsule of male.

FIG. 5. *Sigara* (*Tropocorixa*) *denseconscriptoidea* (Hungerford); genital capsule of male.

FIG. 5a. Dorsal view of male abdomen.

FIG. 5b. Head of male.

FIG. 5c. Pala of male.

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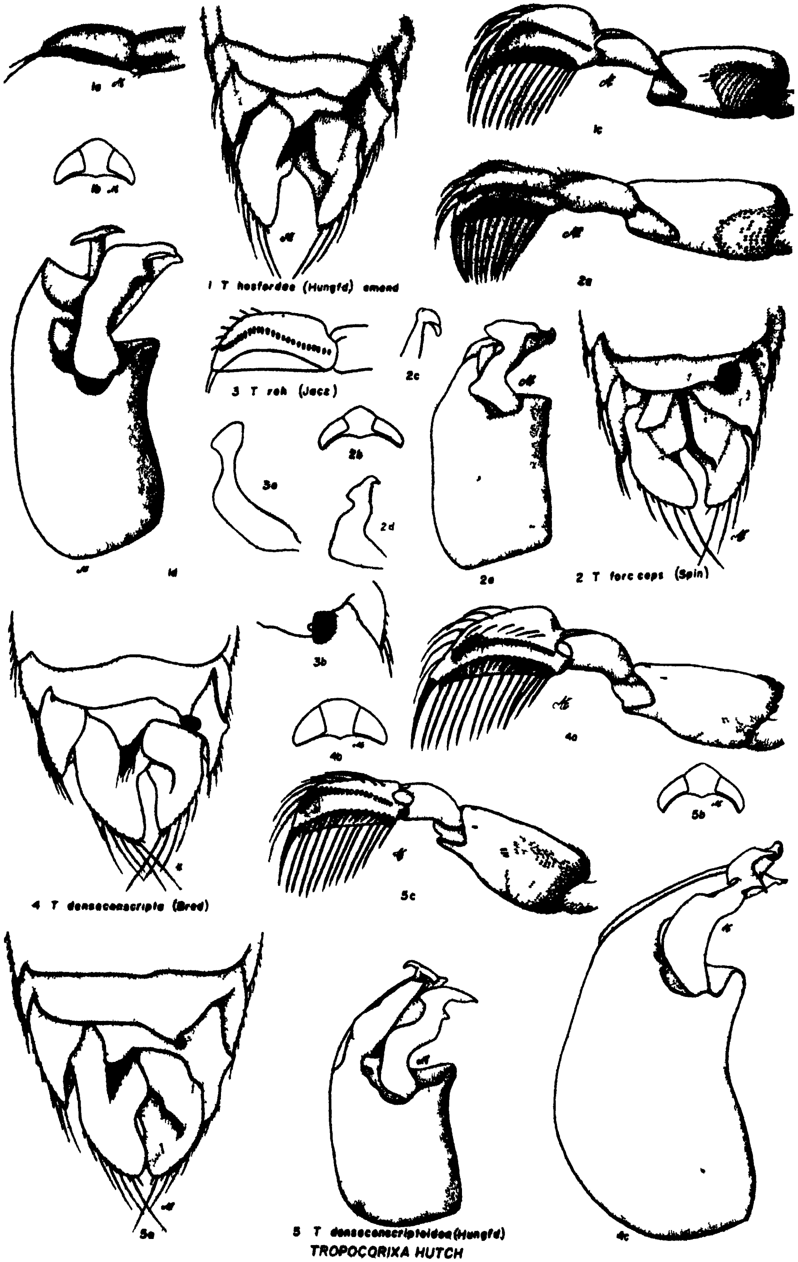
* Drawings after Jaczewski.

PLATE CX



1 T hosfordae (Hungfd) emend

2 T forceps (Spin)

3 T reh (Jacz)

4 T densaconscripta (Bred)

5 T denseconscriptoidea (Hungfd)

TROPOCORIXA HUTCH

PLATE CXI

Sigara Tropocorixa Hutchinson

FIG. 1. *Sigara (Tropocorixa) boliviensis* Hungerford; genital capsule of male.

FIG. 2. Front leg of male.

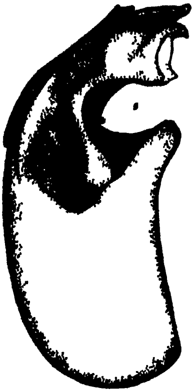
FIG. 3. Dorsal view of male abdomen.

FIG. 4. *Sigara (Tropocorixa) femorodens* Hungerford; genital capsule of male.

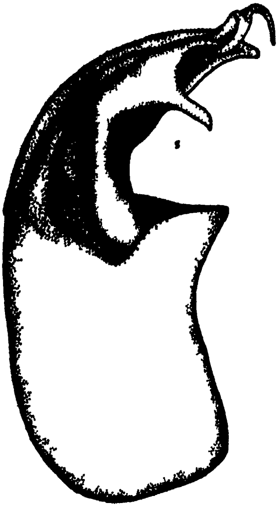
FIG. 5. Front leg of male.

FIG. 6. Dorsal view of male abdomen.

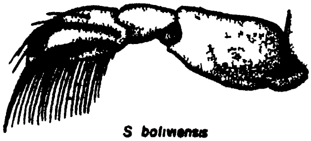
PLATE CXI



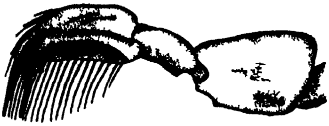
S boliviensis



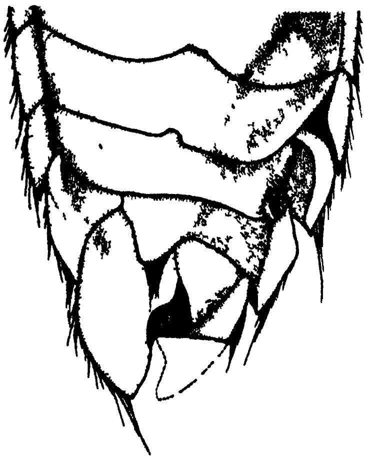
S femoridens



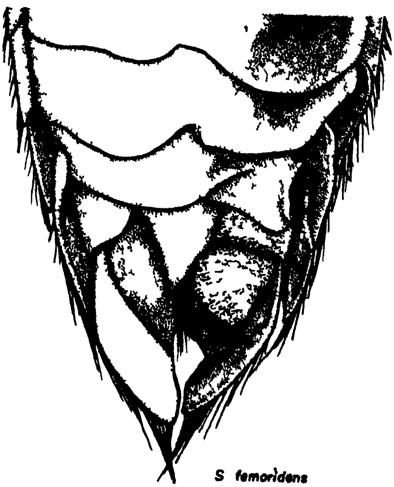
S boliviensis



S femoridens

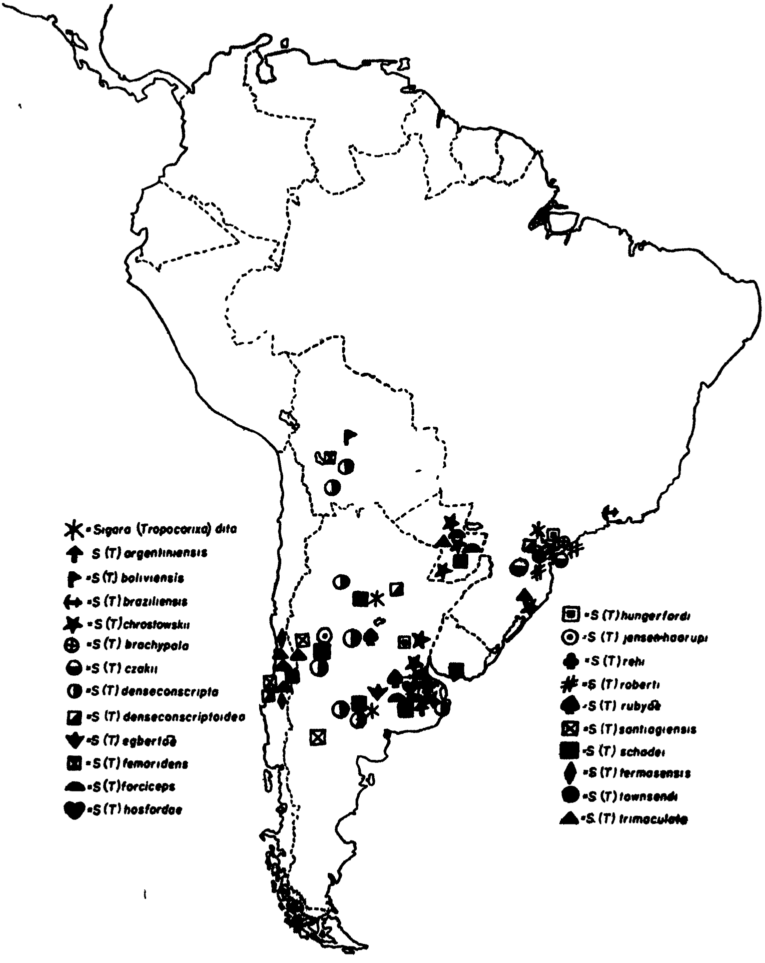


S boliviensis



S femoridens

PLATE CXII


✳ = Sigara (Tropocorixa) dita
⬆ S (T) argentiniensis
= S (T) boliviensis
↔ = S (T) braziliensis
★ = S (T) chrostowskii
⊕ = S (T) brachypala
◒ = S (T) czakii
◐ = S (T) denseconscripta
◪ = S (T) denseconscriptoidea
▼ = S (T) egbertae
= S (T) femoridens
= S (T) forciceps
♥ = S (T) hosfordae
▣ = S (T) hungerfordi
⊙ = S (T) jensen-haarupi
♣ = S (T) rehi
# = S (T) roberti
♠ = S (T) rubyae
⊠ = S (T) santiagiensis
■ = S (T) schadei
◆ = S (T) termosensis
● = S (T) townsendi
▲ = S. (T) trimaculata

ACKNOWLEDGMENTS

Through the thirty years in which I have been interested in the study of the Corixidae I have received the assistance of many friends, so many, in fact, that it seems impossible to recall them all at this time. However, to all of them I wish to express my appreciation for their help, and to the following acknowledge my special gratitude:

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* = synonym
† = not found in Western Hemisphere

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